



Final

**Remedial Action Monitoring Plan
Parcel B
(Excluding Installation Restoration
Sites 7 and 18)**

**Hunters Point Shipyard
San Francisco, California**

December 10, 2010

Prepared for:

**Base Realignment and Closure
Program Management Office West
San Diego, California**

Prepared by:

**ChaduxTt, A Joint Venture of St. George Chadux Corp.
and Tetra Tech EM Inc.
1230 Columbia Street, Suite 1000
San Diego, California 92101**

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PREPARED FOR:
DEPARTMENT OF THE NAVY

REVIEW AND APPROVAL

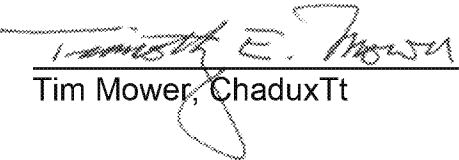
Project Manager:  Date: December 10, 2010
Tim Mower, ChaduxTt

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ACRONYMS AND ABBREVIATIONS

µg/L	Microgram per liter
BGMP	Basewide groundwater monitoring program
bgs	Below ground surface
COC	Chemical of concern
EPA	U.S. Environmental Protection Agency
FFA	Federal facility agreement
HGAL	Hunters Point groundwater ambient level
HHRA	Human health risk assessment
HPS	Hunters Point Shipyard
IR	Installation Restoration
msl	Mean sea level
RAMP	Remedial action monitoring plan
RD	Remedial design
ROD	Record of decision
TCRA	Time-critical removal action
TMSRA	Technical memorandum in support of a record of decision amendment
VOC	Volatile organic compound

EXECUTIVE SUMMARY

This remedial action monitoring plan (RAMP) presents the approach for monitoring groundwater at Parcel B for areas outside of Installation Restoration (IR) Program Sites 7 and 18 at Hunters Point Shipyard (HPS) in San Francisco, California. The objectives of the RAMP are (1) to monitor the potential migration of chemicals of concern (COC) in groundwater into previously uncontaminated areas and potential migration toward San Francisco Bay, (2) to monitor changes in concentrations within a groundwater plume, including the effects of remedial actions, and (3) to monitor concentrations of COCs in groundwater at individual wells where the human health risk assessment indicated potential risk. This plan describes the strategy for monitoring and reporting on groundwater elevations and concentrations of COCs in groundwater at Parcel B for areas outside of IR Sites 7 and 18. Groundwater monitoring requirements for IR Sites 7 and 18 are addressed in a separate RAMP. This RAMP also updates the evaluation of concentrations of metals in groundwater against trigger levels for protection of ecological receptors in San Francisco Bay.

The plan for groundwater monitoring described in this RAMP is part of the amended remedy for Parcel B selected in the amended record of decision (ROD). This RAMP includes groundwater elevation monitoring at 31 wells at Parcel B and six wells in adjacent areas on a quarterly basis to monitor fluctuations in groundwater elevations and changes in the magnitude and direction of groundwater flow. This RAMP further involves sampling at 13 wells to evaluate groundwater conditions at Parcel B. Groundwater monitoring planned as part of this RAMP will be closely coordinated with the ongoing basewide groundwater monitoring program (BGMP) to optimize the utility of the data. Monitoring described in this RAMP will become part of the ongoing BGMP after the final RAMP is approved. Future changes to the groundwater monitoring plan for Parcel B will be implemented as changes to the BGMP.

The plan also describes the presentation of the results of monitoring in semiannual and annual reports and discusses changes to this RAMP. Groundwater elevations will be measured and groundwater will be sampled, to the extent possible, in conjunction with the routine monitoring conducted for other areas of Parcel B and HPS and using similar procedures to promote collection of data that are comparable across HPS.

This RAMP is one component of the overall remedial design (RD) for Parcel B. The other components include design of a durable cover, a shoreline revetment, groundwater treatment, and soil vapor extraction; a land use control RD; a preconstruction operation and maintenance plan; and an engineer's opinion of probable cost. These other components of the RD are also included in this binder with this report.

1.0 INTRODUCTION

This remedial action monitoring plan (RAMP) presents the approach for monitoring groundwater at Parcel B (excluding Installation Restoration [IR] Program Sites 7 and 18) at Hunters Point Shipyard (HPS) in San Francisco, California (see Figure 1). Parcel B includes about 54 acres on the northern side of HPS; the area outside of IR Sites 7 and 18 includes about 40 acres in the central and eastern portions of Parcel B (see Figure 2).

This RAMP is the next step in the process of monitoring groundwater at Parcel B that the Navy began in 1999. The Navy developed a RAMP in 1999 to describe the groundwater monitoring for Parcel B as part of the remedial design (RD) (Tetra Tech EM Inc. and Morrison Knudsen Corporation 1999), which, in turn, was prepared according to the 1997 record of decision (ROD) (Navy 1997). The 1999 RAMP originally included 24 wells at Parcel B (12 in the area outside of IR Sites 7 and 18). The Navy currently monitors 46 wells at Parcel B (37 outside of IR Sites 7 and 18) and has collected samples for 44 quarters as of November 2010.

An amended ROD was prepared for Parcel B (ChaduxTt 2009) because the Navy concluded that the remedy selected in the 1997 ROD needed to be amended to be protective of human health and the environment in the long term and that the proposed amendments to the remedy would fundamentally alter its basic features. The Navy prepared this RAMP for Parcel B to address the requirements of the amended ROD. Groundwater monitoring requirements for other areas of Parcel B (specifically, IR Sites 7 and 18) identified in the amended ROD are addressed by a separate RAMP (ChaduxTt 2010).

The hydrostratigraphic units at Parcel B include (1) the A-aquifer, (2) an aquitard, (3) the B-aquifer, and (4) the deep bedrock water-bearing zone (see Figure 3). The A-aquifer consists mainly of unconsolidated Artificial Fill that overlies the aquitard and bedrock and forms a continuous zone of unconfined groundwater across the parcel. Alluvium and colluvium, Undifferentiated Upper Sand Deposits, and shallow bedrock also are part of the A-aquifer at various locations across Parcel B. The A-aquifer extends from about 5 feet above mean sea level (msl) in the southern portions of the site to about 60 feet below msl near the bay margin. The A-aquifer generally thickens from about 15 feet in the south to as much as 80 feet in the north, but averages about 25 feet thick over most of Parcel B. The B-aquifer consists mainly of Undifferentiated Sedimentary Deposits that overlie bedrock or are contained within the Bay Mud Deposits at a few locations near the bay margin. The B-aquifer is not continuous across Parcel B, but exists primarily in two separate areas: along the western parcel boundary (in IR Site 18), and in a portion of the central area of the parcel. Bay Mud Deposits act as an aquitard that separates the A- and B-aquifers over most of Parcel B, except for the small areas where the Bay Mud is absent and the A- and B-aquifers are adjacent. The B-aquifer extends from about 20 to 50 feet below msl in the central part of Parcel B. The semiconfined B-aquifer includes interbedded sands and clayey silts, ranges in thickness from about 5 to 15 feet where it is present, and averages 10 feet thick. The bedrock water-bearing zone is not considered an aquifer because of its low capacity for water production (primarily from fractures).

Groundwater elevations in the A-aquifer at Parcel B range from about 5 feet above msl in inland areas to mean sea level near the shoreline. In general, groundwater in the A-aquifer flows from south to north, toward San Francisco Bay (see Figure 4). The depth to groundwater in the A-

aquifer varies from about 5 to 15 feet below ground surface (bgs); groundwater is deeper nearer the hillside on the southern portion of Parcel B and becomes gradually shallower near the bay margin. There are no wells in the B-aquifer for the portion of Parcel B outside of IR Sites 7 and 18.

1.1 PURPOSE AND OBJECTIVES

This section presents the purpose and objectives of this RAMP.

1.1.1 Purpose

This RAMP serves two purposes. The first purpose is to monitor the groundwater in the A-aquifer at Parcel B for chemicals of concern (COC) identified in the amended ROD. The second purpose of the RAMP is to evaluate groundwater data collected since 2004 from selected wells against trigger levels established for protection of the beneficial uses of the bay, including ecological receptors. Results of the updated trigger level analysis may be used to add monitoring wells and chemicals to the RAMP.

1.1.2 Objectives

The following are the general objectives, as described in the amended ROD, for monitoring groundwater at Parcel B:

1. To monitor the potential migration of COCs into previously uncontaminated areas and potential migration toward San Francisco Bay (including potential migration of metals from upgradient areas);
2. To monitor the changes in concentrations within a plume, including the effects of remedial actions and previous treatability studies;
3. To monitor concentrations of COCs in groundwater in and near individual wells where the human health risk assessment (HHRA) indicated potential risk.

Groundwater monitoring planned as part of this RAMP will be closely coordinated with the ongoing basewide groundwater monitoring program (BGMP) to optimize the utility of the data.

1.2 REPORT ORGANIZATION

This document is divided into the following sections:

- Section 1.0, Introduction
- Section 2.0, Evaluation of Groundwater Versus Trigger Levels
- Section 3.0, Monitoring Plan
- Section 4.0, Reporting
- Section 5.0, Changes to this RAMP
- Section 6.0, References

Figures, tables, and appendices are presented after Section 6.0.

2.0 EVALUATION OF GROUNDWATER VERSUS TRIGGER LEVELS

Groundwater at Parcel B is in contact with the surface water of the bay; however, the 1997 ROD did not evaluate potential interactions between groundwater and the surface water of the bay. Therefore, the Navy performed a screening evaluation to assess whether the concentrations of chemicals detected in groundwater could affect the surface water of the bay. This evaluation involved a comparison of surface water quality criteria with detected concentrations in the groundwater at Parcel B and included a point-by-point evaluation of the analytical history where concentrations in groundwater exceeded the surface water quality criteria. Chemicals without an established surface water criterion were eliminated from the evaluation. Appendix I of the Technical Memorandum in Support of a ROD Amendment (TMSRA) (ChaduxTt 2007) presents the details of this screening evaluation. Groundwater data for radionuclides were not available; consequently, the screening evaluation in the TMSRA did not consider radionuclides. However, screening criteria for surface water of the bay have not been established for radionuclides. Therefore, radionuclides are eliminated from consideration in the evaluation for trigger levels, similar to other chemicals that do not have screening criteria for surface water.

The data set for the evaluation included data from the most recent 12 samples collected from each well at Parcel B using samples collected through November 2004. The evaluation included 118 wells (including wells in both the A- and B-aquifers) at Parcel B, 90 of which were located outside of IR Sites 7 and 18. The screening evaluation identified 17 chemicals in 44 wells throughout Parcel B (25 wells outside of IR Sites 7 and 18) where at least one sample contained a detected result that exceeded the screening criterion. Those data were further evaluated to focus on trends in detections — especially consistent detections and whether the most recent samples from a well exceeded the surface water quality criterion. This further evaluation found 12 chemicals were not consistently detected. Detections for these 12 chemicals were isolated and infrequent and were followed by at least one sample (but often several samples) that did not exceed the surface water quality criterion. Table I-6 in Appendix I of the TMSRA presents this detailed evaluation.

The screening evaluation at Parcel B indicated that the remaining five chemicals (chromium VI, copper, lead, mercury, and nickel) in the A-aquifer could affect the bay. The results of the screening evaluation were used to identify trigger levels for individual metals at unique well locations. Trigger levels were derived by multiplying an attenuation factor (based on the distance from each well to the bay and an estimated plume width) by the surface water quality criterion, or by the Hunters Point groundwater ambient level (HGAL), whichever was higher. Three metals — chromium VI, lead, and mercury — were of concern in groundwater at four wells at Parcel B outside of IR Sites 7 and 18. Chromium VI was of concern in groundwater at well IR10MW12A. Lead was of concern in groundwater at well IR26MW48A. Mercury was of concern in groundwater at wells IR26MW47A and PA50MW02A. Figure 5 presents the locations of wells at Parcel B.

The amended ROD for Parcel B required that the wells identified by the trigger level evaluation be included in development of the groundwater monitoring program during the RD (that is, this RAMP). According to the amended ROD, inclusion of these wells in the groundwater monitoring program was to be based on the concentrations observed in groundwater at these wells when the design is prepared (in addition to the data set ending in November 2004 that was

used for the trigger level evaluation presented in the TMSRA). Furthermore, wells that were installed and sampled after November 2004 would also be included in the assessment during the RD. These evaluations are presented below.

2.1 SUMMARY OF WELLS IDENTIFIED IN ORIGINAL TRIGGER LEVEL EVALUATION

Table 1 presents the data collected from the four wells listed above through November 2004, as presented in the TMSRA (ChaduxTt 2007), and new data collected through April 2010 (CE2-Kleinfelder 2010b). Appendix A presents graphs illustrating trends in chemical concentrations for selected wells. The data collected for each well are discussed below.

IR10MW12A and IR10MW82A. The trigger level of 225 micrograms per liter ($\mu\text{g/L}$) identified in the TMSRA for chromium VI at well IR10MW12A was the surface water criterion of 50 $\mu\text{g/L}$ multiplied by an attenuation factor of 4.5 based on its distance from the bay (about 550 feet) and an estimated plume width of 40 feet. Of 15 samples collected between 2002 and 2006 from well IR10MW12A, eight results exceed the trigger level for chromium VI.

The Navy investigated the extent of chromium VI near well IR10MW12A in 2002. The Navy installed 10 temporary monitoring wells in the A-aquifer at locations down-, cross-, and up-gradient from well IR10MW12A to monitor concentrations of chromium VI in groundwater in the area of this well. These wells were installed inside Building 123 near potential sources and outside the building near the utility and storm drain lines to identify the sources of chromium VI, delineate the extent of chromium VI in groundwater, and evaluate site conditions. Borings for these wells extended 12 to 15 feet bgs, and the wells characterized the full extent of the A-aquifer in the area around well IR10MW12A. Borings for these wells showed clay beneath the A-aquifer. The study concluded that downward migration of chromium VI was unlikely based on the low hydraulic conductivity of the clay, the large available surface area for adsorption, and the high potential for reduction of chromium VI to chromium III by organic material, iron, and manganese contained in the clay. The study found the extent of chromium VI was limited to the immediate area around well IR10MW12A. Appendix H in the TMSRA (ChaduxTt 2007) contains the report from this investigation.

Well IR10MW12A was decommissioned in July 2006 during removal of a sanitary sewer line as part of the basewide radiological time-critical removal action (TCRA). Well IR10MW12A was replaced by well IR10MW82A, located about 13 feet to the northeast. Both wells encountered similar aquifer materials, screened the same portion of the A-aquifer (from 3 to 18 feet bgs), and were constructed using similar materials. Of 13 samples collected since well IR10MW82A was installed in April 2007, no result exceeded the trigger level or the surface water criterion for chromium VI. Chromium VI was not detected in eight of the 13 samples, and the concentrations measured in the other five samples do not show any trend but appear to be isolated detections. The data from well IR10MW82A do not indicate that chromium VI in groundwater poses a risk to aquatic life in the bay.

IR26MW48A. The trigger level of 14.44 $\mu\text{g/L}$ identified in the TMSRA for lead at well IR26MW48A was the HGAL of 14.44 $\mu\text{g/L}$ multiplied by an attenuation factor of 1 based on its distance from the bay (about 40 feet). Of 21 samples collected since 2002, only one result

(71.5 µg/L in September 2004) exceeded the trigger level for lead. Lead was not detected in 18 of the 21 samples. The concentrations measured in the other three samples do not show any trend but appear to be isolated detections. None of the results from the 11 samples collected after 2004 exceeded the trigger level. The data from well IR26MW48A do not indicate that lead in groundwater poses a risk to aquatic life in the bay.

IR26MW47A and IR26MW49A. The trigger level of 0.6 µg/L identified in the TMSRA for mercury at well IR26MW47A was the HGAL of 0.6 µg/L multiplied by an attenuation factor of 1 based on its distance from the bay (about 65 feet). Of 24 samples collected between 2002 and 2008 from well IR26MW47A, 18 results exceeded the trigger level for mercury. Well IR26MW47A was decommissioned in September 2008 during the TCRA for mercury source control implemented in September and October 2008. Well IR26MW47A was replaced by well IR26MW49A, which is located about 31 feet northeast. Both wells encountered similar aquifer materials, were screened the same portion of the A-aquifer (from 5 to 15 feet bgs), and were constructed using similar materials. Of 17 samples collected since well IR26MW49A was installed in July 2006, 15 results exceeded the trigger level. Concentrations indicate a consistent, fluctuating trend, ranging from about 1 to 3 µg/L. The data from well IR26MW49A indicate that additional monitoring for mercury in groundwater is recommended to evaluate potential risk to aquatic life in the bay.

PA50MW02A. The trigger level of 0.6 µg/L identified in the TMSRA for mercury at well PA50MW02A was the HGAL of 0.6 µg/L multiplied by an attenuation factor of 1 based on its distance from the bay (about 120 feet). Of four samples collected between 1993 and 2001 from well PA50MW02A, two results exceeded the trigger level for mercury. Well PA50MW02A was not sampled after 2001. The data from well PA50MW02A indicate that additional monitoring for mercury in groundwater is recommended to evaluate potential risk to aquatic life in the bay.

2.2 SUMMARY OF NEW WELLS IDENTIFIED AFTER ORIGINAL TRIGGER LEVEL EVALUATION

Five new wells have been installed and sampled at Parcel B since November 2004: IR10MW81A, IR10MW82A, IR26MW49A, IR26MW50A, and IR26MW51A. None of the data collected from wells IR10MW82A or IR26MW50A exceeded surface water criteria. The data collected for the remaining wells are discussed below, and selected data are presented in Table 1. Appendix A presents graphs illustrating trends in chemical concentrations for selected wells.

IR10MW81A. Of 12 samples collected at well IR10MW81A since it was installed in April 2007, only one result exceeded a surface water criterion. The groundwater sample collected in July 2008 indicated a selenium concentration of 26.9 µg/L, which exceeded the surface water criterion (the HGAL of 14.5 µg/L). Selenium was not detected in the subsequent sample collected from this well in March 2009. Furthermore, well IR10MW81A is located about 390 feet from the bay, and an attenuation factor of 4 would apply. The trigger level for selenium at well IR10MW81A would be 58 µg/L, and the July 2008 concentration would not exceed the trigger level. However, the data from well IR10MW81A are not sufficient to establish a trend. Therefore, additional monitoring for selenium in groundwater is recommended to evaluate potential risk to aquatic life in the bay.

IR26MW49A. Of 17 samples collected at well IR26MW49A since it was installed in July 2006, only one result exceeded a surface water criterion (excluding mercury, which is discussed above in relation to well IR26MW47A). The groundwater sample collected in July 2008 indicated a selenium concentration of 19.4 µg/L, which exceeded the surface water criterion (the HGAL of 14.5 µg/L). Well IR26MW49A is located about 40 feet from the bay, and the trigger level would equal the surface water criterion. Selenium was not detected in the subsequent samples collected from this well (also see the graph in Appendix A). However, the data from well IR26MW49A are not sufficient to establish a trend. Therefore, additional monitoring for selenium in groundwater is recommended to evaluate potential risk to aquatic life in the bay.

IR26MW51A. Of six samples collected at well IR26MW51A since it was installed in January 2009, four results exceeded the surface water criterion for mercury. Well IR26MW51A is located about 40 feet from the bay, and the trigger level would equal the surface water criterion. Concentrations indicate a consistent, fluctuating trend, ranging from about 0.5 to 1.5 µg/L. The data from well IR26MW51A indicate that additional monitoring for mercury in groundwater is recommended to evaluate potential risk to aquatic life in the bay.

In summary, further monitoring for metals is recommended at wells IR10MW81A, IR26MW49A, IR26MW51A, and PA50MW02A based on the evaluation of groundwater data versus trigger levels.

3.0 MONITORING PLAN

This section discusses the approach for monitoring groundwater elevations and concentrations of COCs in groundwater at Parcel B outside of IR Sites 7 and 18. Procedures for measuring groundwater elevations and collecting groundwater samples are in place for the BGMP at HPS (CE2-Kleinfelder 2008). The groundwater monitoring described in this RAMP will follow the procedures accepted for the BGMP. Appendix B of this report contains well construction details for the wells selected for monitoring. Monitoring described in this RAMP will become part of the ongoing BGMP after the final RAMP is approved by the federal facility agreement (FFA) signatories; ongoing monitoring under the BGMP will continue until that time.

3.1 GROUNDWATER ELEVATION MONITORING

Groundwater elevations will be measured at the selected wells at Parcel B and adjacent areas to monitor fluctuations in the groundwater elevations and changes in the magnitude and direction of groundwater flow. Groundwater elevations will be measured quarterly at the wells listed in Table 2. The wells listed in Table 2 were selected to allow preparation of representative potentiometric surface elevation contour maps. Geographic location, screened interval, and especially monitoring history were among the selection criteria used to identify wells for monitoring for groundwater elevation. Groundwater elevations will be measured in conjunction with wells from other parcels to optimize the utility of the data for elevation mapping. Figure 5 presents the locations of the wells to be monitored for groundwater elevation. Figure 4 shows the potentiometric surface elevation of the A-aquifer in May 2010. There are no wells in the B-aquifer in the portion of Parcel B addressed by this RAMP.

Groundwater elevations will be measured, to the extent possible, in conjunction with the routine monitoring conducted for other areas of Parcel B and HPS and using similar measurement procedures (CE2-Kleinfelder 2008) to promote collection of data that are comparable across HPS.

3.2 GROUNDWATER CHEMICAL CONCENTRATION MONITORING

The following sections discuss monitoring groundwater for COCs, including volatile organic compounds (VOC) and selected metals. Groundwater will be sampled, to the extent possible, in conjunction with the routine monitoring conducted for other areas of Parcel B and HPS and using similar procedures (CE2-Kleinfelder 2008) to promote collection of data that are comparable across HPS. Table 3 lists the wells proposed for chemical concentration monitoring.

The following sections discuss the rationale for selection of wells for chemical concentration monitoring. Concentrations of VOCs will be compared with the remediation goals established in the amended ROD for Parcel B (see Table 4). Concentrations of metals will be compared with the appropriate trigger level (see Table 5). Data review procedures and adjustments to the frequency of sampling (including cessation of sampling) will be evaluated consistent with the current procedures at HPS, as discussed in Section 5.0. Furthermore, the risk posed by VOCs in groundwater is based on vapor intrusion, and the need for and frequency of continued monitoring of groundwater may be re-evaluated based on the results of the soil gas survey that is in progress at Parcel B (Sealaska Environmental Services LLC 2010).

Samples will be collected semiannually beginning after the RAMP is approved. Semiannual sampling is proposed based on plume stability demonstrated from historical sampling results. All of the monitoring wells listed on Table 3 are sampled as part of the BGMP to track groundwater conditions at Parcel B. These wells will continue to be sampled under this RAMP. Samples will continue to be collected until reduction in frequency or cessation of sampling is approved by the FFA signatories. For example, stable or declining trends in concentrations that are below remediation goals may be used as justification to reduce the frequency of sampling or to remove a well from the monitoring program proposed in this RAMP. Changes to sampling frequency will be reviewed and approved by the FFA signatories before they are implemented. Table 3 lists the wells selected for monitoring. Figure 5 presents the locations of the wells to be monitored.

3.2.1 Volatile Organic Compounds

Two types of areas that require monitoring for VOCs occur within Parcel B: areas related to a VOC plume, and areas related to individual wells where the HHRA or the trigger level evaluation indicated potential risk. Monitoring for each of these areas is described below.

3.2.1.1 Plume Areas

IR Site 10 Area

The amended ROD for Parcel B (ChaduxTt 2009) identified treatment of VOCs in groundwater as a component of the remedy. The design basis report (also located in this binder) presents information on the proposed groundwater treatment for the VOC plume at IR Site 10. This RAMP presents the details of groundwater monitoring that will follow completion of groundwater treatment. The proposed treatment for groundwater will include an implementation monitoring phase where groundwater will be monitored in the treatment area to evaluate the success of the groundwater treatment. Details of implementation monitoring are included in the design basis report; monitoring in the area of groundwater treatment described in this RAMP will occur after the implementation monitoring phase.

The objectives of monitoring the VOC plume at IR Site 10 will be to monitor changes in concentrations within the plume and to monitor any potential migration of the plume toward the bay. Groundwater monitoring will also track the progress of natural attenuation processes that will occur after the active phase of groundwater treatment. Table 3 lists the wells selected in the area of the VOC plume at IR Site 10 to meet these monitoring objectives and the monitored natural attenuation parameters that will be used to track natural attenuation processes. Figure 5 presents the locations of the wells to be monitored.

Area Northeast of IR Site 25 (Parcel C)

Although treatment of groundwater was not required, the amended ROD for Parcel B also identified groundwater monitoring for VOCs to address potential migration onto Parcel B from areas near Building 134 on adjacent Parcel C. Wells near the boundary with Parcel C identified in the HHRA that contained concentrations of VOCs that posed potential risk based on vapor intrusion included IR10MW14A, IR20MW17A, IR24MW04A, IR25MW61A1, and IR25MW61A2 (refer to Figure 7-3 of the amended ROD). Each well is discussed further below. Appendix A presents graphs illustrating trends in chemical concentrations for selected wells.

IR10MW14A. Of eight samples collected at well IR10MW14A since 2005, only two results indicated the presence of any VOCs. Trichloroethene was detected at estimated concentrations of 0.5 µg/L in a sample collected in December 2005 and of 0.32 µg/L in a sample collected in November 2006. No detections were observed in three subsequent samples collected in 2007 and 2008. (Also see the graph in Appendix A.) No further groundwater monitoring is recommended at well IR10MW14A.

IR20MW17A. Both samples collected at well IR20MW17A indicated concentrations of vinyl chloride (18 µg/L in July 2008 and 7.1 µg/L in March 2009) that exceeded the remediation goal. Continued monitoring is recommended at well IR20MW17A.

IR24MW04A and IR46MW37A. Well IR24MW04A was decommissioned in 1998; nearby well IR46MW37A was used as a replacement. Both wells encountered similar aquifer materials, screened a similar portion of the A-aquifer (from 6 to 16 feet bgs in IR24MW04A and from 6 to 21 feet bgs in IR46MW37A), and were constructed using similar materials. Of 10 samples collected from nearby well IR46MW37A (about 130 feet upgradient) between 2005

and 2008, none indicated a detection of any VOCs. Wells located downgradient from former well IR24MW04A have not been sampled for analysis of the chlorinated VOCs that might migrate from Parcel C. Additional monitoring is recommended at well IR24MW07A (screened from 5 to 20 feet bgs) downgradient from former well IR24MW04A.

IR25MW61A1. Of 13 samples collected at well IR25MW61A1 since 2005, none indicated the presence of any VOCs. No further groundwater monitoring is recommended at well IR25MW61A1.

IR25MW61A2. Of 12 samples collected at well IR25MW61A2 since 2005, none indicated the presence of any VOCs. No further groundwater monitoring is recommended at well IR25MW61A2.

3.2.1.2 Individual Wells

The HHRA in the TMSRA (ChaduxTt 2007) indicated potential risk to human health based on vapor intrusion at several individual wells at Parcel B that were not associated with the VOC plumes described above. These wells included IR07MWS-1, IR26MW41A, and IR26MW45A. Appendix A presents graphs illustrating trends in chemical concentrations for selected wells.

IR07MWS-1. Well IR07MWS-1 was decommissioned. Of three samples collected from nearby well UT03MW11A (about 45 feet downgradient) in 2006 and 2007, none indicated a detection of any VOCs. No further groundwater monitoring is recommended at well UT03MW11A.

IR26MW41A. Results from six of nine samples collected at well IR26MW41A between December 2005 and October 2007 indicated concentrations of dichlorodifluoromethane that exceeded the remediation goal (see the graph in Appendix A). Concentrations followed a broadly fluctuating trend, ranging from 15 to 35 µg/L (compared with the remediation goal of 14 µg/L). Continued monitoring is recommended at well IR26MW41A.

IR26MW45A. Well IR26MW45A was decommissioned in 2001 as part of soil removals for Excavation EE-05 during the remedial action at Parcel B. The HHRA identified potential risk from chloroform detected in samples collected in 2000. Chloroform was detected in three of six samples collected from 1999 to 2001. Detected concentrations ranged from 3 to 4 µg/L (compared with the remediation goal of 1 µg/L). None of the wells surrounding former well IR26MW45A was sampled for VOCs. The area surrounding former well IR26MW45A was excavated to 10 feet bgs during the remedial action at Parcel B during 1999 to 2001. Furthermore, the excavated area was enlarged and deepened during removals that were part of the TCRA for mercury undertaken in 2008. The A-aquifer in the area of well IR26MW45A exists within a relatively thin layer of fill materials overlying bedrock (see Figure 3). Approximately 13 feet of fill was logged over bedrock in the boring for IR26MW45A; groundwater was measured at about 7 feet bgs in January 2001 before the well was decommissioned. Therefore, most of the A-aquifer at and around former well IR26MW45A has been excavated, and it is unlikely that any source for VOCs remains in the area based on the extensive removals. Consequently, no further groundwater monitoring for VOCs is recommended in the area of former well IR26MW45A.

3.2.2 Selected Metals

The evaluation of groundwater versus trigger levels in Section 2.0 identified the need to monitor selected metals in groundwater at wells IR10MW81A, IR26MW49A, IR26MW51A, and PA50MW02A. Table 3 lists these wells; Figure 5 shows their locations. Samples will be collected semiannually, beginning after the RAMP is approved. Concentrations of metals will be compared with the trigger levels listed in Table 5.

3.2.3 Bay Margin Monitoring

One of the objectives for monitoring groundwater includes monitoring potential migration toward San Francisco Bay. This RAMP also includes sampling at three wells (IR24MW07A, IR26MW49A, and IR46MW43A) located near the bay for selected metals of potential ecological concern to monitor for potential changes in concentrations in the event that groundwater conditions change during redevelopment. Sampling is proposed for a suite of six chemicals of potential ecological concern (chromium VI, copper, lead, mercury, nickel, and selenium) that were found to pose a potential risk to aquatic life in the bay based on the surface water quality screening evaluation for Parcel B or other parcels at HPS. Samples will be collected semiannually, beginning after the RAMP is approved and continuing until at least 2 years after redevelopment. Concentrations of metals will be compared with the trigger levels listed in Table 5.

3.2.4 Comparison to Benchmarks

The Navy will notify the FFA signatories when chemical concentrations exceed a comparison benchmark (that is, remediation goals for VOCs or trigger levels for metals). Consistent with current procedures at HPS, the Navy will send the notification after validated data have been received (about 3 months after samples were collected). The following additional evaluations may occur for the cases where data indicate concentrations consistently exceed a comparison benchmark:

- Increasing the frequency of monitoring in the well where the comparison benchmark was exceeded to evaluate whether the elevated level is persistent;
 - Evaluation of whether an elevated level is persistent may include statistical analysis of trends and multiple verification of statistically significant results that exceed criteria;
- Monitoring groundwater at a location farther downgradient to evaluate whether the attenuation estimated in establishing the trigger level has occurred;
 - Downgradient monitoring will include evaluation of plume stability;
- Using site-specific detailed information to more accurately estimate attenuation (including processes such as adsorption and degradation); or
- Implementing a selected remediation alternative for groundwater treatment.

4.0 REPORTING

The Navy will present the results of groundwater monitoring in semiannual or annual reports. Groundwater monitoring reports will be similar to reports prepared previously for Parcel B and for other areas at HPS (for example, CE2-Kleinfelder 2010a) for consistency and comparability across HPS. One semiannual report and one annual report will be prepared each year. Reporting frequencies may be revised, as appropriate, with prior approval of the FFA signatories. The following sections discuss these reports.

4.1 SEMIANNUAL REPORTS

Semiannual reports will summarize basic monitoring data and analytical results. Each report will include the following information:

- Tabulated groundwater levels for wells monitored; figures showing the locations of monitoring points and the groundwater potentiometric surface
- Tabulated analytical results for each monitoring well sampled; figures showing the extent of chemicals in groundwater
- Copies of sample chain-of-custody forms, field sampling forms and notes, laboratory analytical and data validation reports, including quality assurance and quality control information, and other associated forms
- Comparison of analytical results with remediation goals for VOCs and with appropriate trigger levels for metals
- Description of deviations from this RAMP
- Identification of damage to monitoring wells and recommendations for corrective action
- Recommendations for adjustments to this RAMP

4.2 ANNUAL REPORTS

Annual reports will provide evaluation and interpretation of the data collected over the previous year in addition to summarizing basic monitoring data and analytical results from the preceding 6 months.

Objectives for annual reports include:

- Evaluate groundwater data obtained during the past year to identify significant trends in chemical concentrations and in directions of groundwater flow
- Evaluate COC concentrations in monitoring wells
- Describe deviations from this RAMP
- Discuss analytical data quality
- Recommend adjustments to this RAMP

5.0 CHANGES TO THIS RAMP

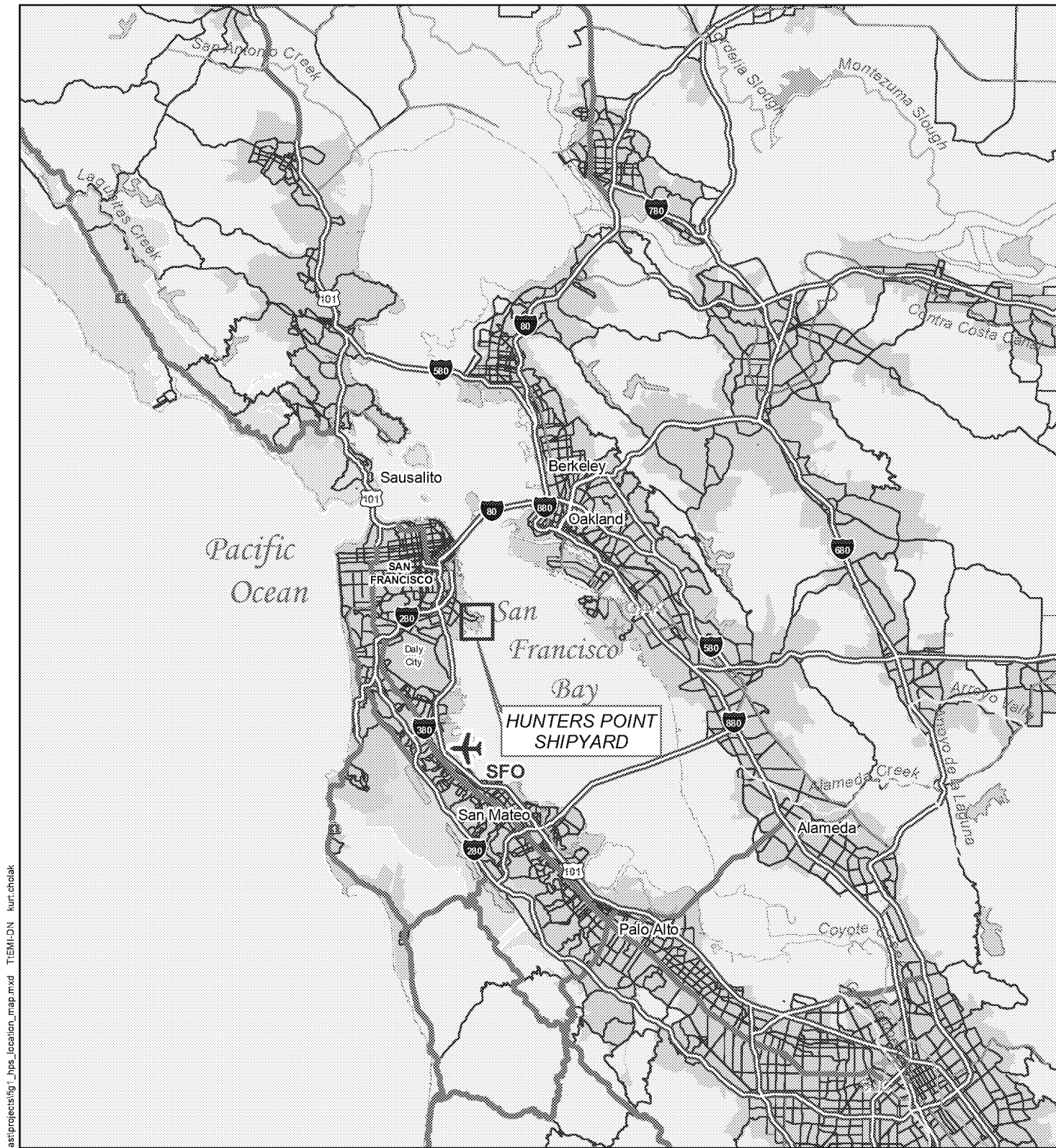
Monitoring described in this RAMP will become part of the ongoing BGMP after the FFA signatories approve the final RAMP. Future changes to the groundwater monitoring plan for Parcel B will be implemented as changes to the BGMP. The Navy intends the groundwater monitoring strategy presented in this RAMP to be adaptable based on the data collected, in accordance with the U.S. Environmental Protection Agency's (EPA) Triad approach (EPA 2001), to allow flexibility to optimize monitoring. The Navy will discuss the results of groundwater monitoring with the FFA signatories. The Navy may revise the list of wells to be sampled, the analytes measured, or the frequency of sampling based on the results of the groundwater monitoring as described in this RAMP, with the approval of the FFA signatories. The process for changing the RAMP, including procedures for data review and modification of plans for groundwater sampling, will follow the process described in the BGMP (CE2-Kleinfelder 2008).

Results of groundwater monitoring will be used during 5-year reviews required under the Comprehensive Environmental Response, Compensation, and Liability Act to assess the monitoring program, adjust the data collection and analysis requirements, and evaluate the need for other response actions.

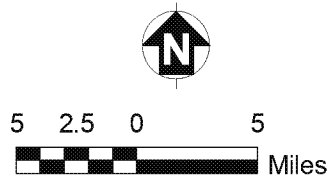
6.0 REFERENCES

- CE2-Kleinfelder. 2008. "Draft Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Basewide Groundwater Monitoring Program, Hunters Point Shipyard, San Francisco, California." June.
- CE2-Kleinfelder. 2010a. "Semi-annual Groundwater Monitoring Report, October 2009—March 2010, Hunters Point Shipyard, San Francisco, California." June.
- CE2-Kleinfelder. 2010b. Data Portal for Basewide Groundwater Monitoring Program, Hunters Point Shipyard, San Francisco, California. Available online at: http://www.ce2corporation.com/hp_portal/login.asp (contact CE2-Kleinfelder for user access).
- ChaduxTt. 2007. "Final Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California." December 12.
- ChaduxTt. 2009. "Final Amended Parcel B Record of Decision, Hunters Point Shipyard, San Francisco, California." January 26.
- ChaduxTt. 2010. "Final Remedial Design Package, Installation Restoration Sites 7 and 18, Parcel B, Hunters Point Shipyard, San Francisco, California." January 8.
- Department of the Navy. 1997. "Hunters Point Shipyard, Parcel B, Final Record of Decision." October 7.
- Sealaska Environmental Services, LLC. 2010. "Work Plan for Soil Vapor Intrusion Survey Parcels B, D-1, G, and UC-2." July.
- Tetra Tech EM Inc. and Morrison Knudsen Corporation. 1999. "Final Remedial Action Monitoring Plan, Parcel B, Hunters Point Shipyard, San Francisco, California." Revision 2. August 19.
- U.S. Environmental Protection Agency (EPA). 2001. "Improving Sampling, Analysis, and Data Management for Site Investigation and Cleanup." EPA-542-F-01-030a. April.

FIGURES



Location Map

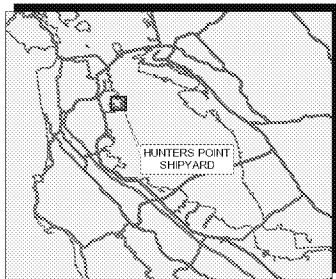
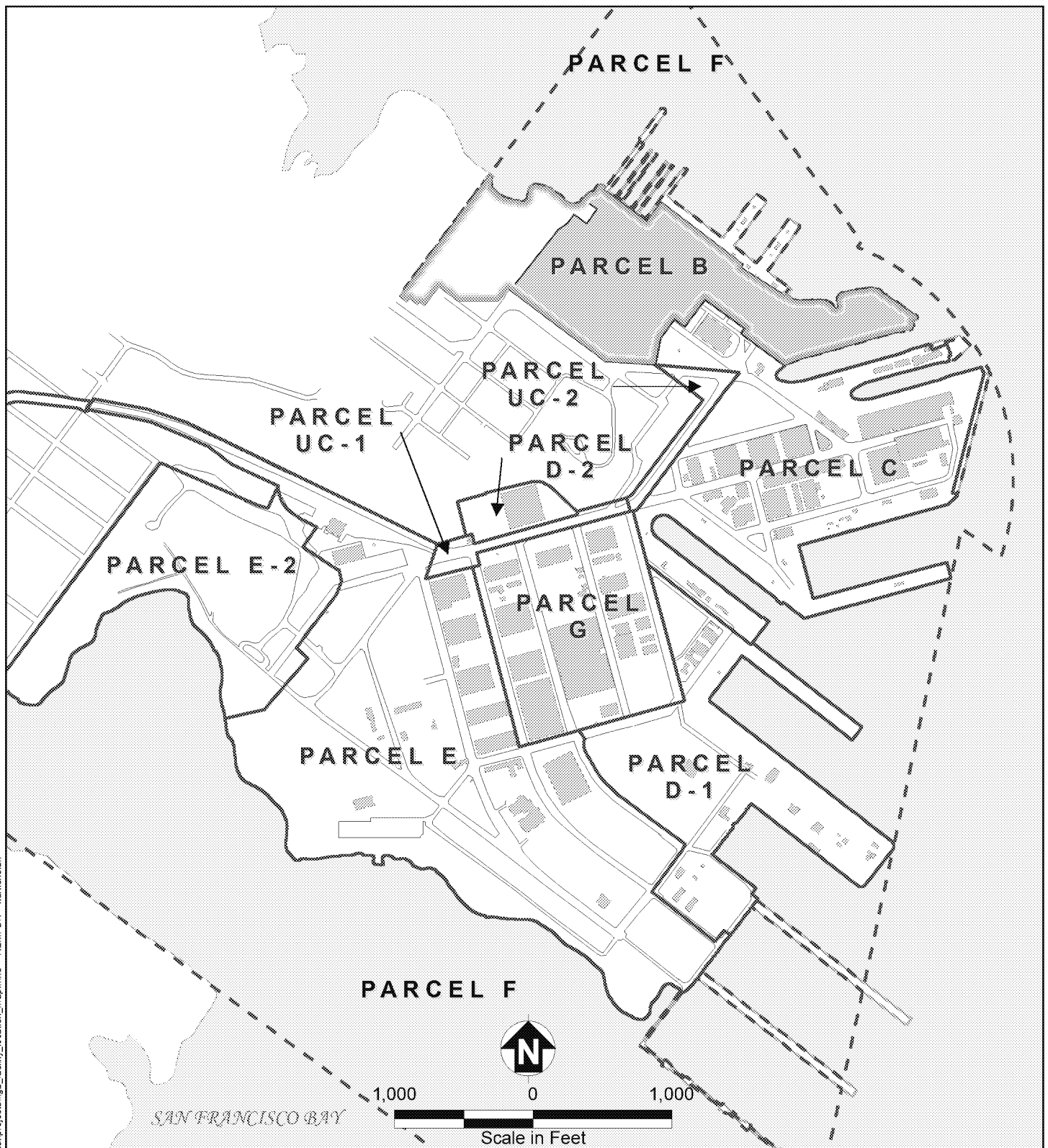


Hunters Point Shipyard, San Francisco, California
 Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 1
HUNTERS POINT SHIPYARD
LOCATION MAP

RAMP for Parcel B

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Location Map

- Parcel B Excluding Installation Restoration Sites 7 and 18
- Parcel B Boundary
- Parcel Boundary
- Parcel F Boundary
- Building
- Non-Navy Property
- Road

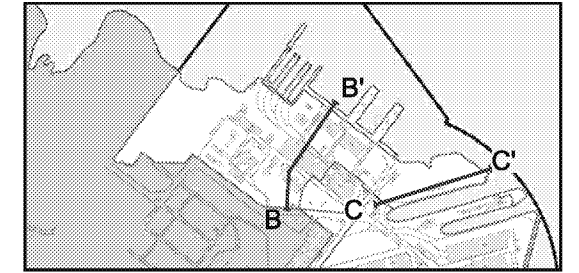
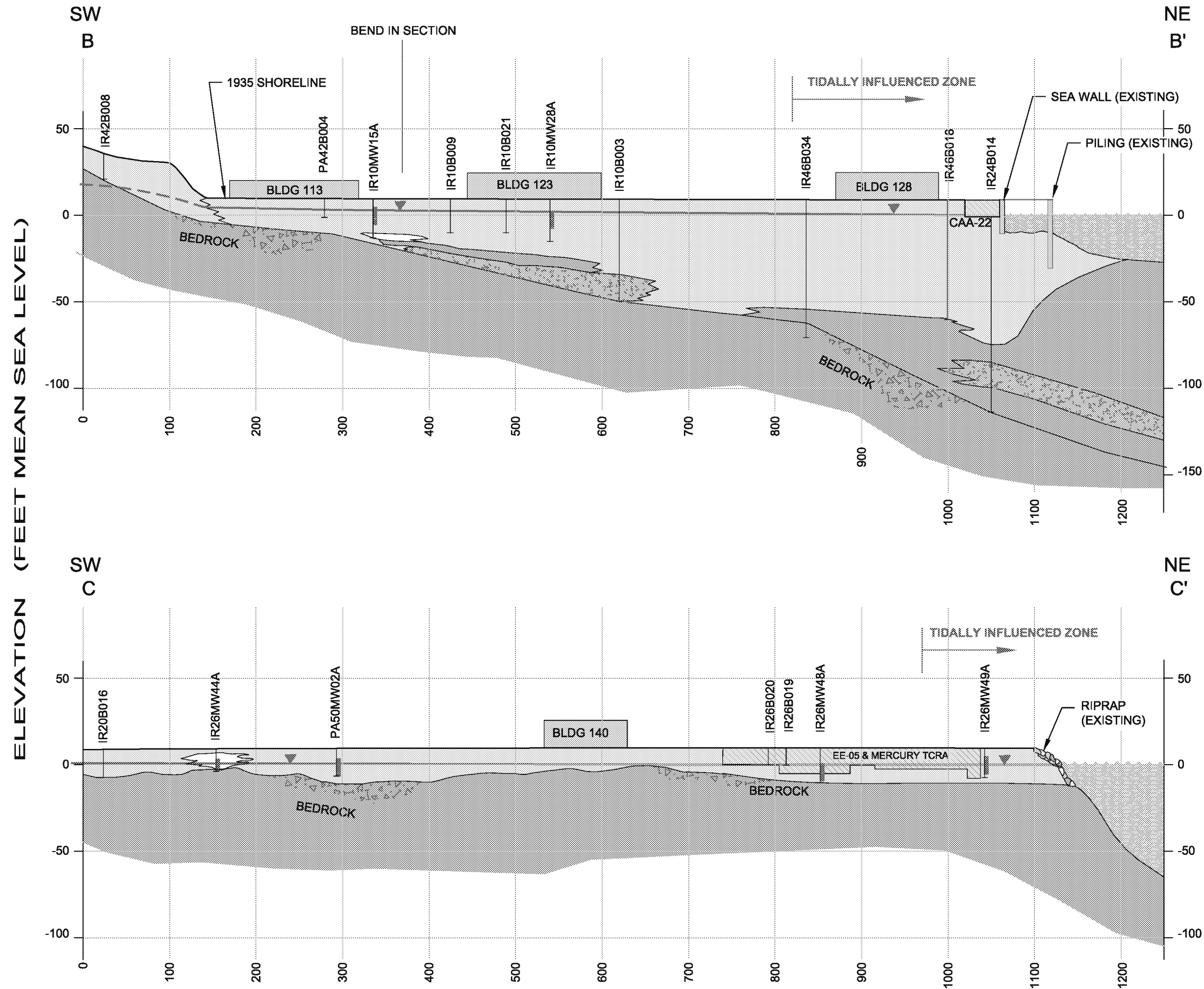


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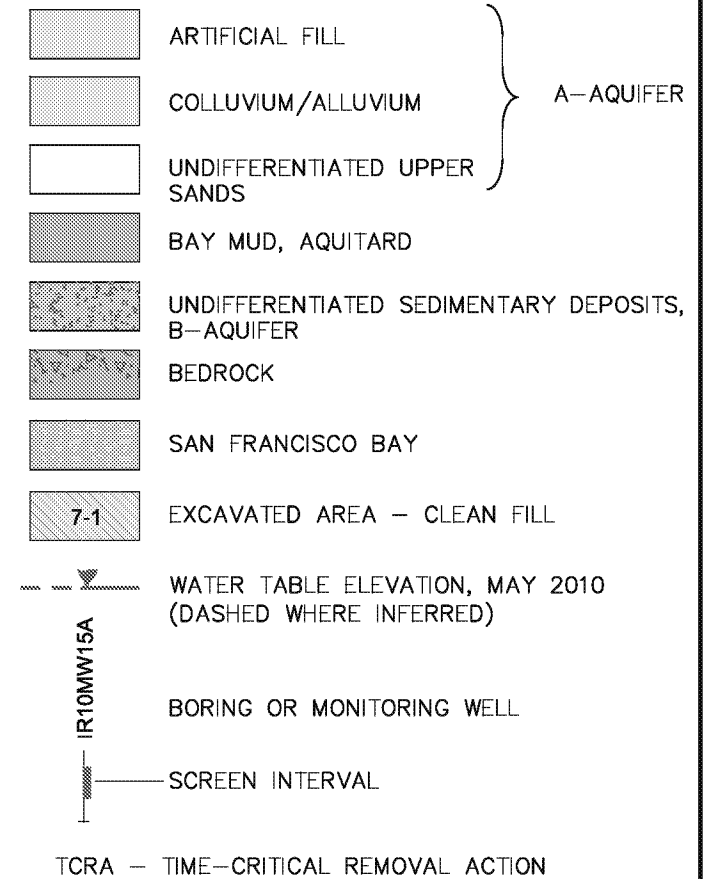
FIGURE 2 FACILITY LOCATION MAP

RAMP for Parcel B

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CROSS SECTION LOCATION MAP



SCALE: 1" = 120'
HORIZONTAL SCALE



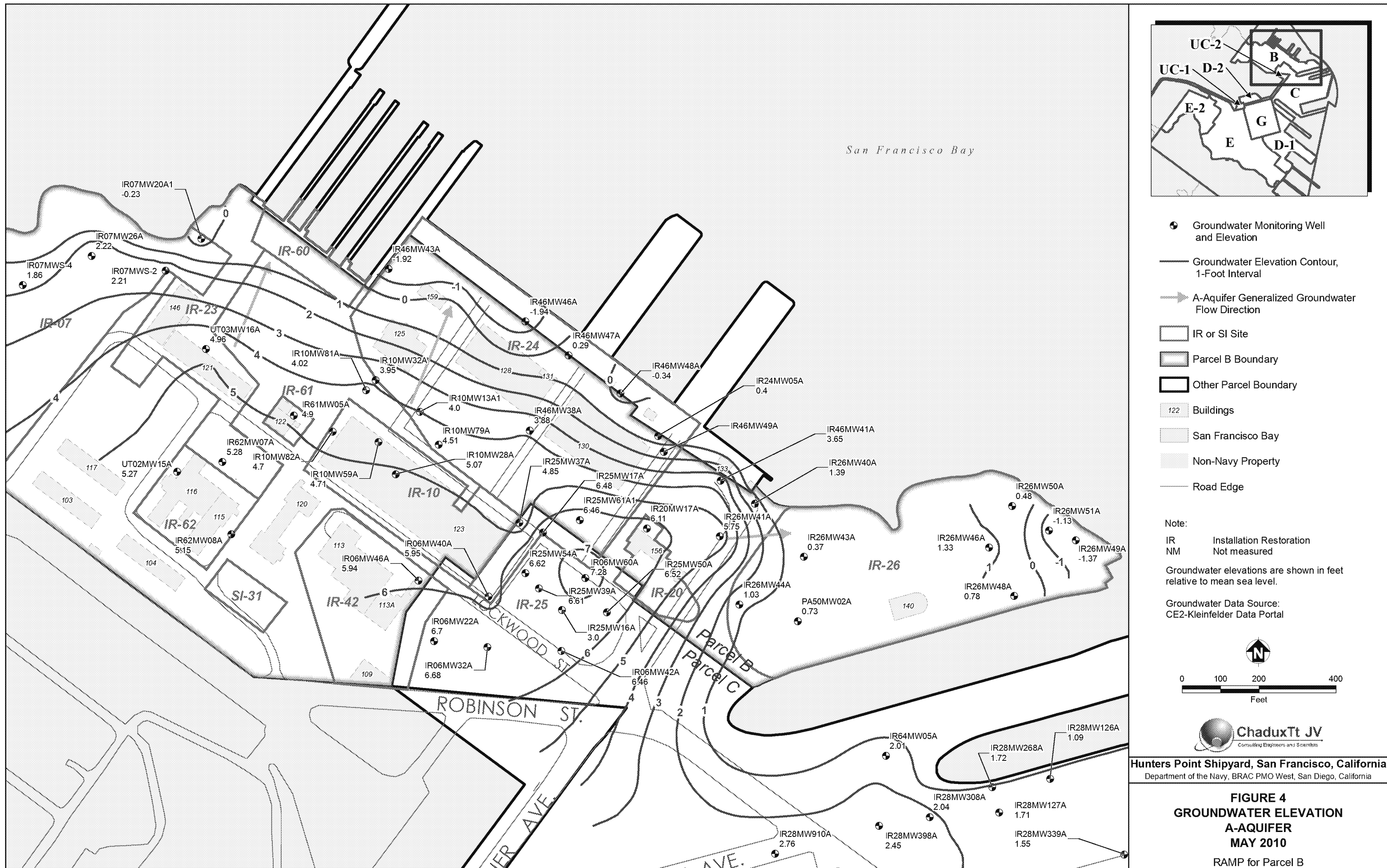
SCALE: 1" = 60'
VERTICAL SCALE
VERTICAL EXAGGERATION = 2X



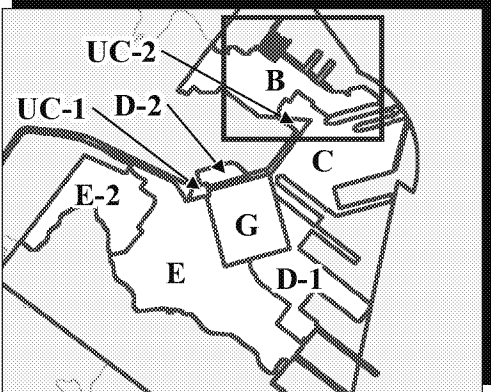
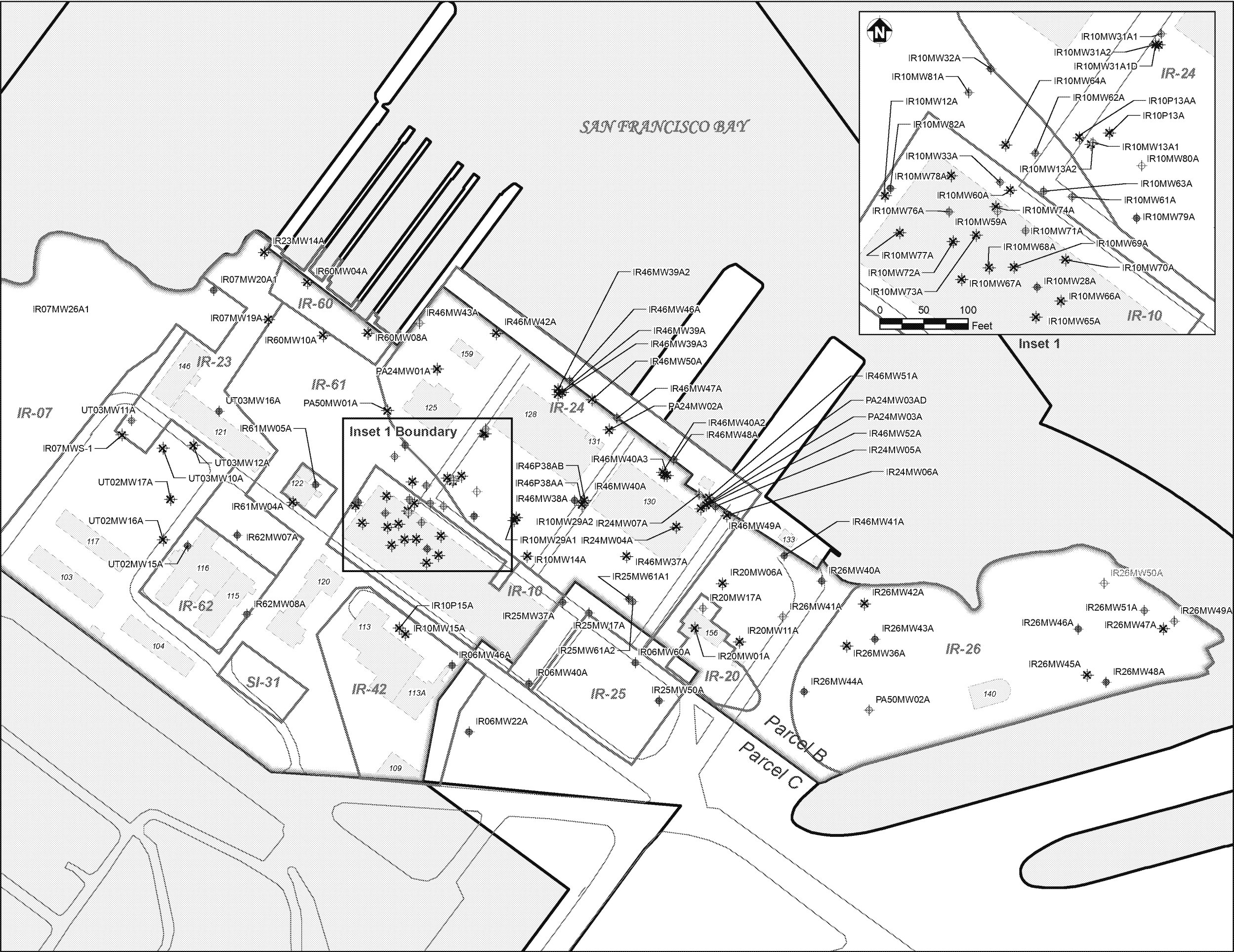
Hunters Point Shipyard, San Francisco, California
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 3
CROSS SECTIONS OF AQUIFERS AT
PARCEL B

RAMP for Parcel B

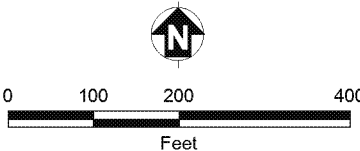


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- Well for Chemical Concentration and Groundwater Elevation Monitoring
- Well for Chemical Concentration Monitoring Only
- Well for Groundwater Elevation Monitoring Only
- Other Monitoring Well, Not Selected for Monitoring
- Well Planned to be Decommissioned
- Decommissioned Monitoring Well

- Road Edge
- IR or SI Site
- Parcel B Boundary
- Other Parcel Boundary
- Building
- San Francisco Bay
- Non-Navy Property



Hunters Point Shipyard, San Francisco, California
Department of the Navy, BRAC PMO West, San Diego, California

**FIGURE 5
GROUNDWATER MONITORING
WELL LOCATIONS**

RAMP for Parcel B

TABLES

TABLE 1: EVALUATION OF SELECTED GROUNDWATER SAMPLES

Remedial Action Monitoring Plan, Parcel B (Excluding IR Sites 7 and 18)
Hunters Point Shipyard, San Francisco, California

Sampling Location	Sample Date	Result (µg/L)	Qualifier	Exceed Criterion?	Exceed Trigger Level?
Wells that exceeded surface water criteria based on data through November 2004.					
Chromium VI (Surface Water Criterion = 50 µg/L)					
Well IR10MW12A, Trigger Level = 225 µg/L^a					
IR10MW12A	13-Mar-02	375		YES	YES
IR10MW12A	30-May-02	160		YES	NO
IR10MW12A	29-Aug-02	60		YES	NO
IR10MW12A	12-Nov-02	10	U	NO	NO
IR10MW12A	12-Mar-03	170		YES	NO
IR10MW12A	22-May-03	360		YES	YES
IR10MW12A	20-Aug-03	320		YES	YES
IR10MW12A	11-Nov-03	220		YES	NO
IR10MW12A	23-Mar-04	550		YES	YES
IR10MW12A	07-Jun-04	170		YES	NO
IR10MW12A	31-Aug-04	20	U	NO	NO
IR10MW12A	16-Nov-04	260		YES	YES
IR10MW12A	19-Dec-05	680		YES	YES
IR10MW12A	13-Mar-06	240	J	YES	YES
IR10MW12A	23-May-06	487	J	YES	YES
Well IR10MW12A was decommissioned in July 2006. Adjacent well IR10MW82A was used as a replacement.					
IR10MW82A	21-May-07	0.86		NO	NO
IR10MW82A	16-Aug-07	0.5	U	NO	NO
IR10MW82A	03-Oct-07	0.5	U	NO	NO
IR10MW82A	05-Mar-08	3		NO	NO
IR10MW82A	15-Apr-08	0.5	U	NO	NO
IR10MW82A	16-Jul-08	0.5	U	NO	NO
IR10MW82A	07-Oct-08	0.5	U	NO	NO
IR10MW82A	17-Mar-09	26.9	J	NO	NO
IR10MW82A	13-May-09	0.5	U	NO	NO
IR10MW82A	14-Sep-09	0.5	U	NO	NO
IR10MW82A	05-Oct-09	0.5	U	NO	NO
IR10MW82A	01-Feb-10	4		NO	NO
IR10MW82A	21-Apr-10	30.8		NO	NO
Lead (HGAL = 14.44 µg/L)					
Well IR26MW48A, Trigger Level = 14.44 µg/L^a					
IR26MW48A	18-Mar-02	2.1	U	NO	NO
IR26MW48A	03-Jun-02	2.4	U	NO	NO
IR26MW48A	04-Sep-02	1.3	U	NO	NO
IR26MW48A	13-Nov-02	0.7	U	NO	NO

TABLE 1: EVALUATION OF SELECTED GROUNDWATER SAMPLES (CONTINUED)

Remedial Action Monitoring Plan, Parcel B (Excluding IR Sites 7 and 18)
Hunters Point Shipyard, San Francisco, California

Sampling Location	Sample Date	Result (µg/L)	Qualifier	Exceed Criterion?	Exceed Trigger Level?
IR26MW48A	23-May-03	1.2	U	NO	NO
IR26MW48A	13-Aug-03	14.8	UJ	Limit > criterion	Limit > criterion
IR26MW48A	05-Nov-03	2.1	U	NO	NO
IR26MW48A	29-Mar-04	50	U	Limit > criterion	Limit > criterion
IR26MW48A	07-Jun-04	10	U	NO	NO
IR26MW48A	07-Sep-04	71.5		YES	YES
IR26MW48A	19-Dec-05	10	UJ	NO	NO
IR26MW48A	14-Mar-06	10	UJ	NO	NO
IR26MW48A	30-May-06	10	U	NO	NO
IR26MW48A	23-Aug-06	10	UJ	NO	NO
IR26MW48A	08-Dec-06	10	U	NO	NO
IR26MW48A	22-Feb-07	10	U	NO	NO
IR26MW48A	08-May-07	10	UJ	NO	NO
IR26MW48A	14-Aug-07	100	U	Limit > criterion	Limit > criterion
IR26MW48A	10-Oct-07	11.2	J	NO	NO
IR26MW48A	05-Mar-08	4	J	NO	NO
IR26MW48A	15-Apr-08	10	UJ	NO	NO
Mercury (HGAL = 0.6 µg/L)					
Well IR26MW47A, Trigger Level = 0.6 µg/L^a					
IR26MW47A	12-Mar-02	0.4		NO	NO
IR26MW47A	03-Jun-02	1.3		YES	YES
IR26MW47A	03-Sep-02	1.6		YES	YES
IR26MW47A	14-Nov-02	0.99		YES	YES
IR26MW47A	11-Mar-03	0.18	B	NO	NO
IR26MW47A	22-May-03	0.99		YES	YES
IR26MW47A	13-Aug-03	2.64		YES	YES
IR26MW47A	06-Nov-03	1.5		YES	YES
IR26MW47A	29-Mar-04	1.45		YES	YES
IR26MW47A	07-Jun-04	1.05		YES	YES
IR26MW47A	07-Sep-04	2.4		YES	YES
IR26MW47A	17-Nov-04	2.8		YES	YES
IR26MW47A	15-Dec-05	0.6		NO	NO
IR26MW47A	13-Mar-06	0.44		NO	NO
IR26MW47A	30-May-06	0.34	U	NO	NO
IR26MW47A	24-Aug-06	0.77	U	Limit > criterion	Limit > criterion
IR26MW47A	16-Nov-06	1.3		YES	YES
IR26MW47A	19-Feb-07	1.7		YES	YES
IR26MW47A	08-May-07	1.2		YES	YES
IR26MW47A	14-Aug-07	2.7		YES	YES

TABLE 1: EVALUATION OF SELECTED GROUNDWATER SAMPLES (CONTINUED)

Remedial Action Monitoring Plan, Parcel B (Excluding IR Sites 7 and 18)
Hunters Point Shipyard, San Francisco, California

Sampling Location	Sample Date	Result (µg/L)	Qualifier	Exceed Criterion?	Exceed Trigger Level?
IR26MW47A	10-Oct-07	3.1		YES	YES
IR26MW47A	05-Mar-08	2.4		YES	YES
IR26MW47A	03-Jun-08	2.2		YES	YES
IR26MW47A	21-Jul-08	3		YES	YES
Well IR26MW47A was decommissioned in September 2008. Adjacent well IR26MW49A was used as a replacement. Data presented for well IR26MW49A since installation in July 2006.					
IR26MW49A	24-Aug-06	0.6	U	NO	NO
IR26MW49A	16-Nov-06	0.88		YES	YES
IR26MW49A	19-Feb-07	0.96		YES	YES
IR26MW49A	08-May-07	1.1		YES	YES
IR26MW49A	14-Aug-07	1.8		YES	YES
IR26MW49A	10-Oct-07	2.4		YES	YES
IR26MW49A	05-Mar-08	1.5		YES	YES
IR26MW49A	15-Apr-08	1.4		YES	YES
IR26MW49A	16-Jul-08	2.9		YES	YES
IR26MW49A	16-Sep-08	1.93		YES	YES
IR26MW49A	10-Oct-08	1.2		YES	YES
IR26MW49A	10-Mar-09	10	U	Limit > criterion	Limit > criterion
IR26MW49A	11-May-09	1.3		YES	YES
IR26MW49A	14-Jul-09	2.3		YES	YES
IR26MW49A	07-Oct-09	2.6		YES	YES
IR26MW49A	29-Jan-10	1.8		YES	YES
IR26MW49A	22-Apr-10	2.6		YES	YES
Well PA50MW02A, Trigger Level = 0.6 µg/L^a					
PA50MW02A	31-Mar-93	0.18		NO	NO
PA50MW02A	18-Aug-94	0.91		YES	YES
PA50MW02A	15-Jun-95	0.1	U	NO	NO
PA50MW02A	23-Jul-01	0.65		YES	YES
Wells installed after November 2004 that have concentrations exceeding surface water criteria.					
Selenium (HGAL = 14.5 µg/L)					
Well IR10MW81A, Trigger Level = 58 µg/L based on 390 feet to bay					
IR10MW81A	16-Jul-08	26.9		YES	NO
IR10MW81A	17-Mar-09	5	U	NO	NO
Well IR26MW49A, Trigger Level = 14.5 µg/L based on 40 feet to bay					
IR26MW49A	16-Jul-08	19.4		YES	YES
IR26MW49A	10-Mar-09	5	U	NO	NO
IR26MW49A	11-May-09	5.0	U	NO	NO

TABLE 1: EVALUATION OF SELECTED GROUNDWATER SAMPLES (CONTINUED)

Remedial Action Monitoring Plan, Parcel B (Excluding IR Sites 7 and 18)
Hunters Point Shipyard, San Francisco, California

Sampling Location	Sample Date	Result (µg/L)	Qualifier	Exceed Criterion?	Exceed Trigger Level?
Samples from well IR26MW49A also exceed surface water criterion for mercury. See results listed above under well IR26MW47A.					
Mercury (HGAL = 0.6 µg/L)					
Well IR26MW51A, Trigger Level = 0.6 µg/L based on 40 feet to bay					
IR26MW51A	31-Mar-09	7.3	U	Limit > criterion	Limit > criterion
IR26MW51A	11-May-09	0.74		YES	YES
IR26MW51A	14-Jul-09	1.1		YES	YES
IR26MW51A	07-Oct-09	1.1		YES	YES
IR26MW51A	29-Jan-10	1.6		YES	YES
IR26MW51A	22-Apr-10	0.58		NO	NO

Notes:

- a Trigger levels from TMSRA for Parcel B (ChaduxTt 2007).
 µg/L Microgram per liter
 B Detected in blank
 HGAL Hunters Point groundwater ambient level
 J Estimated detected result
 TMSRA Technical memorandum in support of a record of decision amendment
 U Nondetected result

Reference:

ChaduxTt. 2007. "Final Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California." December 12.

TABLE 2: WELLS FOR GROUNDWATER ELEVATION MONITORING
Remedial Action Monitoring Plan, Parcel B (Excluding IR Sites 7 and 18)
Hunters Point Shipyard, San Francisco, California

Monitoring Wells for Groundwater Elevations	Parcel
IR06MW46A	B
IR10MW13A1	B
IR10MW28A	B
IR10MW32A	B
IR10MW59A	B
IR10MW79A	B
IR10MW82A	B
IR20MW17A	B
IR24MW05A	B
IR25MW61A1	B
IR26MW40A	B
IR26MW41A	B
IR26MW43A	B
IR26MW44A	B
IR26MW46A	B
IR26MW48A	B
IR26MW49A	B
IR46MW38A	B
IR46MW41A	B
IR46MW43A	B
IR46MW46A	B
IR46MW47A	B
IR46MW48A	B
IR61MW05A	B
IR62MW07A	B
IR62MW08A	B
PA50MW02A	B
UT02MW15A	B
UT03MW16A	B
IR07MW20A1	B (IR Site 7)
IR07MW26A1	B (IR Site 7)
IR06MW22A	C
IR06MW40A	C
IR06MW60A	C
IR25MW17A	C
IR25MW37A	C
IR25MW50A	C

Notes: Groundwater elevations will be measured quarterly.

IR Installation Restoration

TABLE 3: WELLS FOR CHEMICAL CONCENTRATION MONITORING
Remedial Action Monitoring Plan, Parcel B, Excluding IR Sites 7 and 18
Hunters Point Shipyard, San Francisco, California

Well	Analysis ^a
IR Site 10 VOC Plume	
IR10MW13A1	1,2-DCE, TCE, vinyl chloride, MNA parameters ^b
IR10MW31A1	1,2-DCE, TCE, vinyl chloride, MNA parameters ^b
IR10MW59A	1,2-DCE, TCE, vinyl chloride, MNA parameters ^b
IR10MW61A	1,2-DCE, TCE, vinyl chloride, MNA parameters ^b
IR10MW71A	1,2-DCE, TCE, vinyl chloride, MNA parameters ^b
Other VOC Monitoring	
IR20MW17A	Vinyl chloride
IR24MW07A	VOCs listed on Table 4
IR26MW41A	Dichlorofluoromethane
Metals Monitoring Based on Trigger Levels	
IR10MW81A ^c	Selenium
IR26MW49A	Mercury, selenium
IR26MW51A	Mercury
PA50MW02A	Mercury
Metals Monitoring at Bay Margin Wells	
IR46MW43A	Select metals suite ^d
IR24MW07A ^e	Select metals suite ^d
IR26MW49A ^e	Select metals suite ^d

Notes: Groundwater samples will be collected semiannually for all wells.

a Sampling these wells is ongoing as part of the basewide groundwater monitoring program (BGMP). Sampling recommended in the RAMP will be incorporated into the BGMP after the final RAMP is approved. Samples will continue to be collected semiannually until a reduction in frequency or cessation of sampling is approved by the federal facility agreement (FFA) signatories (EPA, DTSC, and Water Board).

b MNA parameters: field measurements for pH, dissolved oxygen, and ORP and laboratory measurements for anions (alkalinity, nitrate/nitrite, sulfate, chloride, sulfide, manganese, iron), dissolved gases (ethane, ethene), and total organic carbon

c Current chemical concentration data indicate concentrations are consistently below remediation goals or trigger levels. This well is likely to be recommended for cessation of sampling after the RAMP takes effect.

d Select metals suite includes chromium VI, copper, lead, mercury, nickel, and selenium.

e Well is also monitored for other objectives beyond bay margin monitoring.

BGMP Basewide groundwater monitoring program

DCE Dichloroethene

DTSC Department of Toxic Substances Control

EPA U.S. Environmental Protection Agency

FFA Federal facility agreement

MNA Monitored natural attenuation

ORP Oxidation reduction potential

TCE Trichloroethene

VOC Volatile organic compound

Water Board San Francisco Bay Regional Water Quality Control Board

TABLE 4: REMEDIATION GOALS FOR GROUNDWATER

Remedial Action Monitoring Plan, Parcel B, Excluding IR Sites 7 and 18
Hunters Point Shipyard, San Francisco, California

Chemical	Remediation Goal ^a (micrograms per liter)
1,2,4-Trichlorobenzene	66
1,2,4-Trimethylbenzene	25
1,2-Dichlorobenzene	2,561
1,2-Dichloroethane	2.3
1,2-Dichloroethene (total)	209
1,2-Dichloropropane	1.1
1,3,5-Trimethylbenzene	19
1,4-Dichlorobenzene	2.1
2-Methylnaphthalene	707
Benzene	0.5
Bromodichloromethane	1
Chlorobenzene	392
Chloroethane	6.5
Chloroform	1.0
cis-1,2-Dichloroethene	209
Dichlorodifluoromethane	14
Mercury	0.68
Methylene chloride	27
Naphthalene	3.6
Tetrachloroethene	1
trans-1,2-Dichloroethene	182
Trichloroethene	2.9
Trichlorofluoromethane	176
Vinyl chloride	0.5

Notes:

- a Remediation goals from the amended record of decision for Parcel B (ChaduxTt 2009). Goals based on residential exposure via vapor intrusion. Remediation goals listed here for groundwater may be superseded by future action levels for soil gas based on the results of future soil gas surveys.

Reference:

ChaduxTt. 2009. "Final Amended Parcel B Record of Decision, Hunters Point Shipyard, San Francisco, California." January 26.

TABLE 5: TRIGGER LEVELS FOR SELECTED METALS IN GROUNDWATER

Remedial Action Monitoring Plan, Parcel B, Excluding IR Sites 7 and 18
Hunters Point Shipyard, San Francisco, California

Metal	Monitoring Well(s)	Trigger Level ^a (micrograms per liter)
Chromium VI	IR46MW43A, IR24MW07A, IR26MW49A	50
Copper	IR46MW43A, IR24MW07A, IR26MW49A	28.04
Lead	IR46MW43A, IR24MW07A, IR26MW49A	14.44
Mercury	IR26MW49A, IR26MW51A, PA50MW02A, IR46MW43A, IR24MW07A	0.6
Nickel	IR46MW43A, IR24MW07A, IR26MW49A	96.48
Selenium	IR10MW81A	58.0
Selenium	IR26MW49A, IR46MW43A, IR24MW07A	14.5

Notes:

a Trigger levels from TMSRA for Parcel B (ChaduxTt 2007).

TMSRA Technical memorandum in support of a record of decision amendment

Reference:

ChaduxTt. 2007. "Final Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California." December 12.

APPENDIX A
GRAPHS OF CHEMICAL CONCENTRATIONS

EXPLANATION

Open symbol indicates no detection and the value shown is the detection limit.

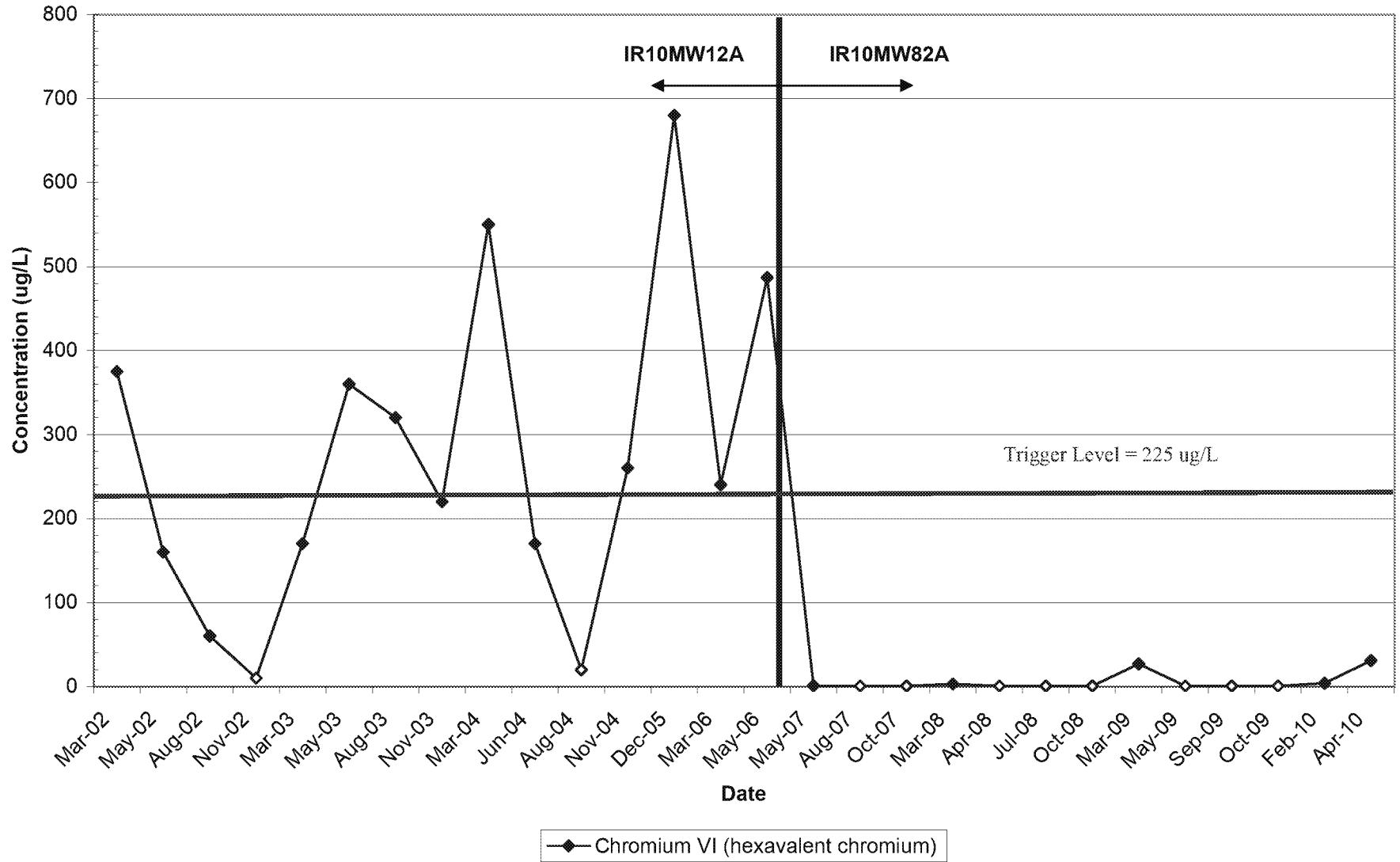
Concentration trend lines are broken when there is a significant (usually more than 12 to 18 months) hiatus in sample collection.

Abbreviations

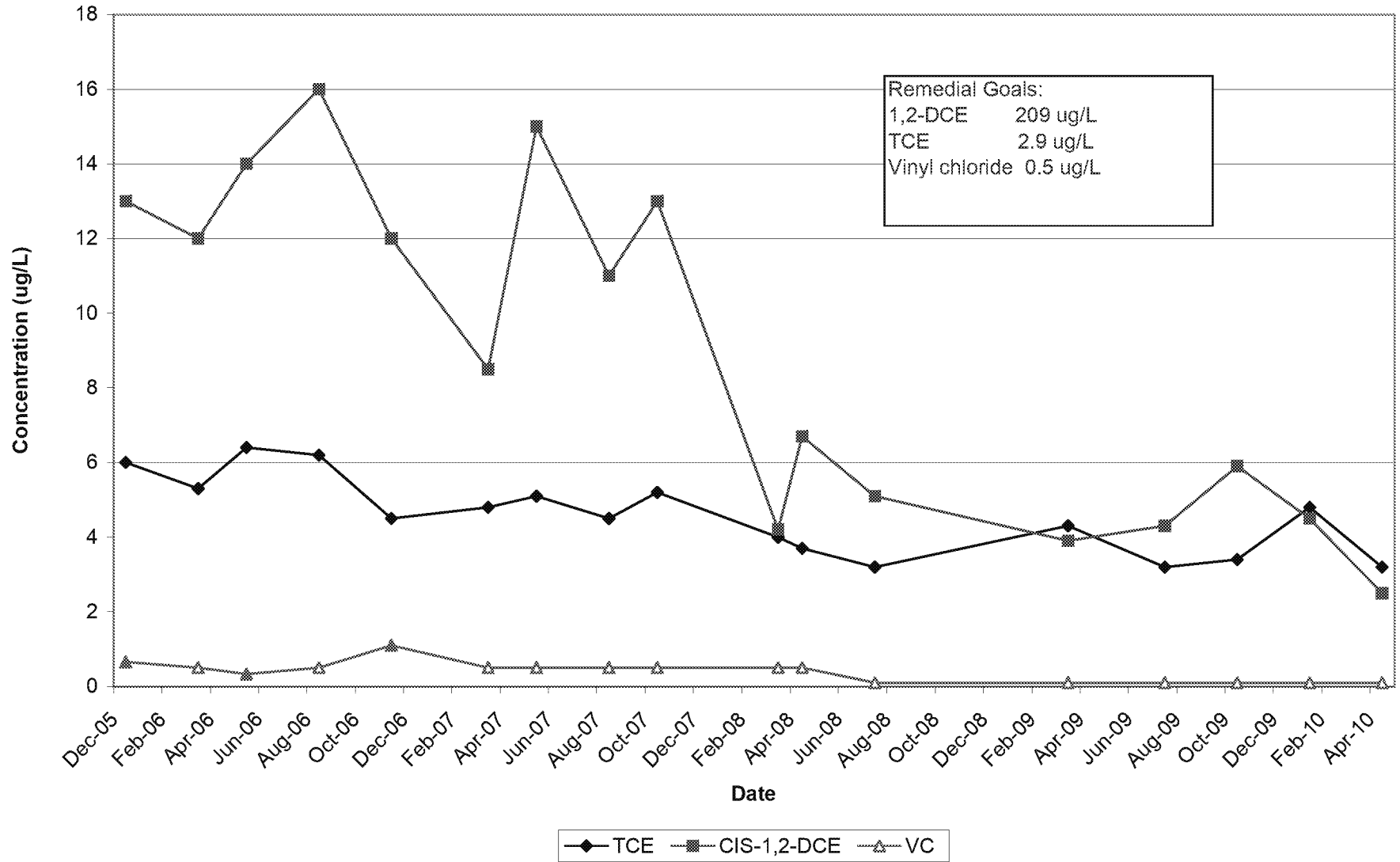
DCE	Dirchloroethene
ug/L	Microgram per liter
TCE	Trichloroethene
TCRA	Time critical removal action
U	Not detected
VC	Vinyl chloride
ZVI	Zero-valent iron

IR10MW12A / IR10MW82A

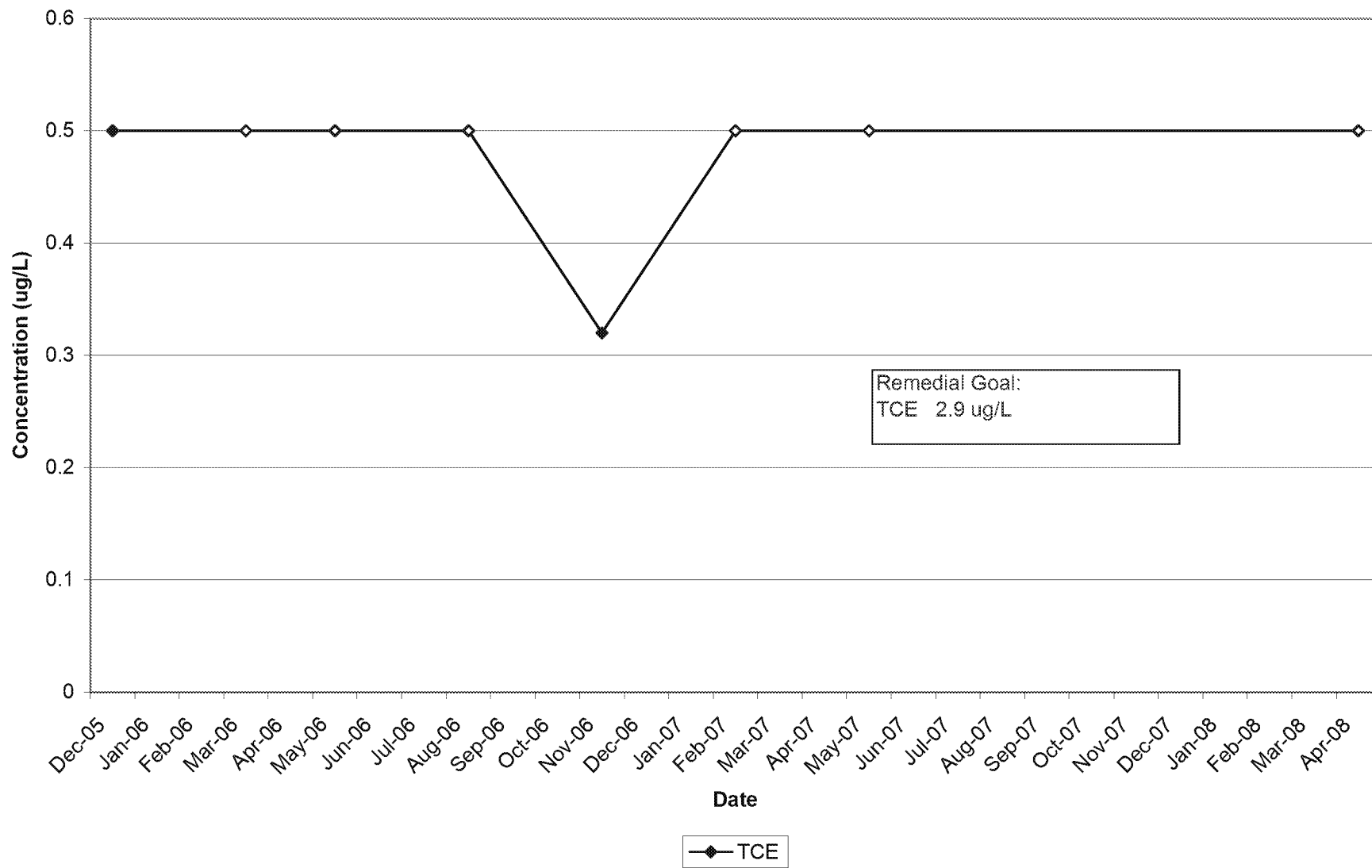
(Well IR10MW12A was decommissioned on 7/24/06; well IR10MW82A used as a replacement.)



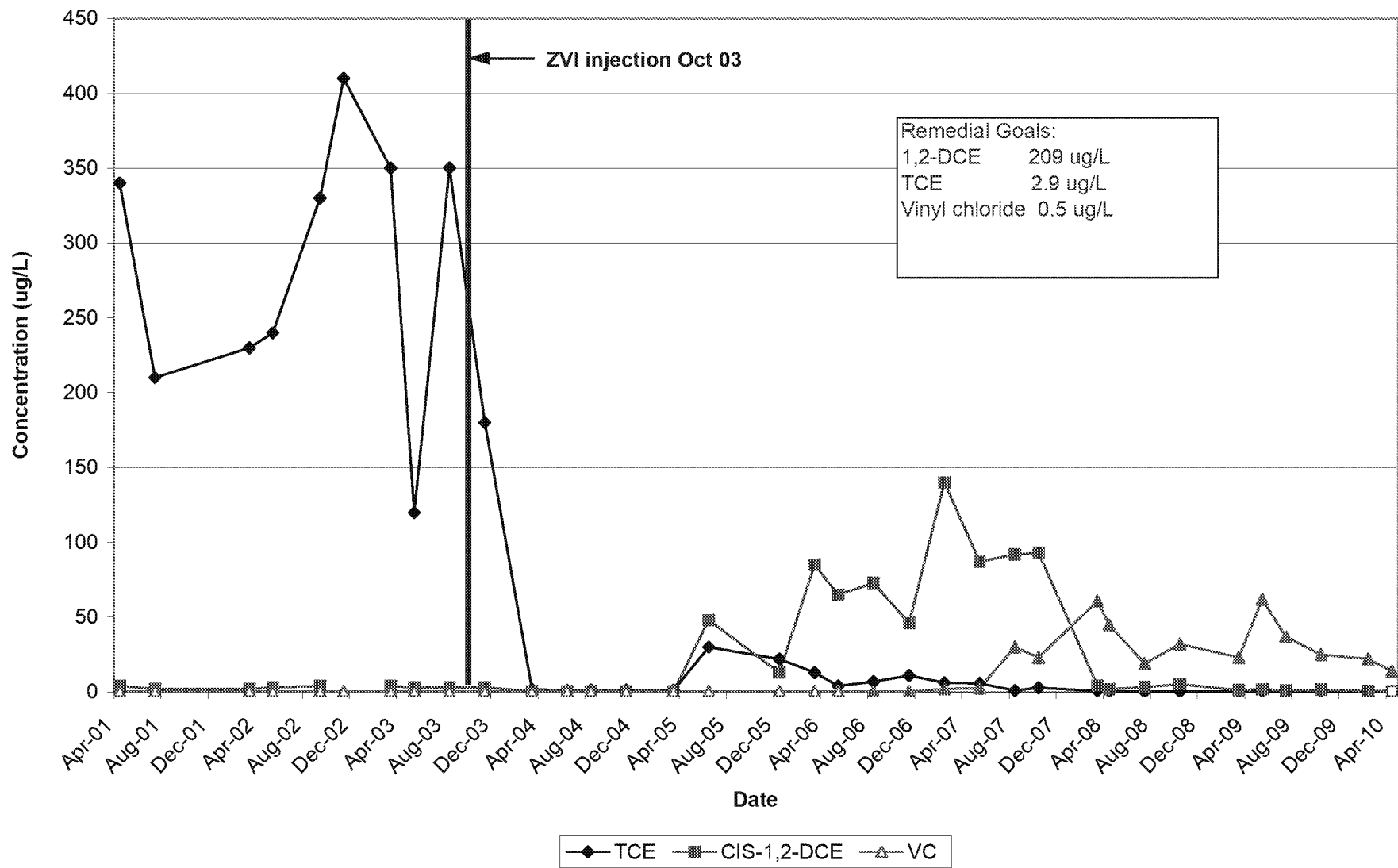
IR10MW13A1



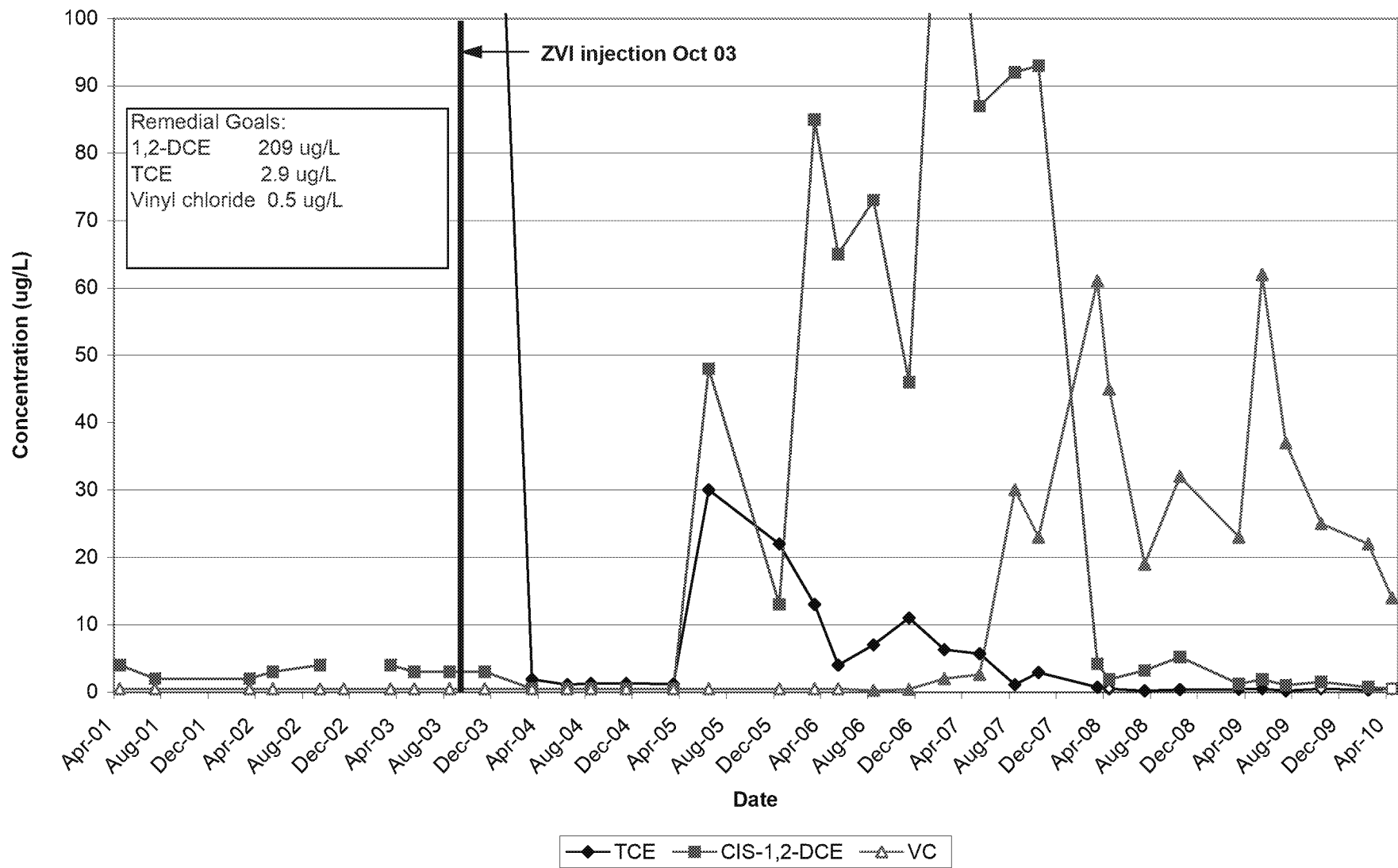
IR10MW14A



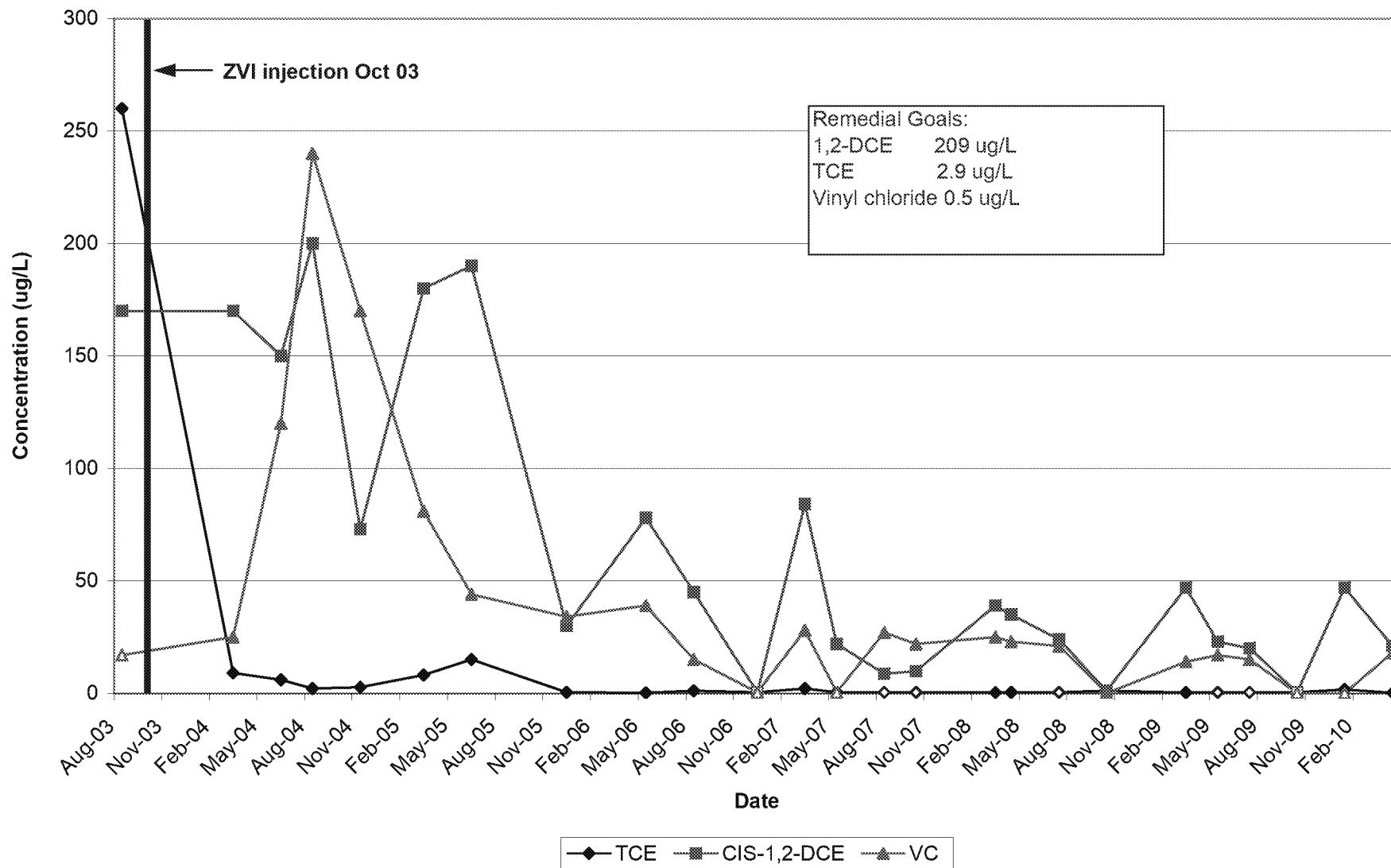
IR10MW59A



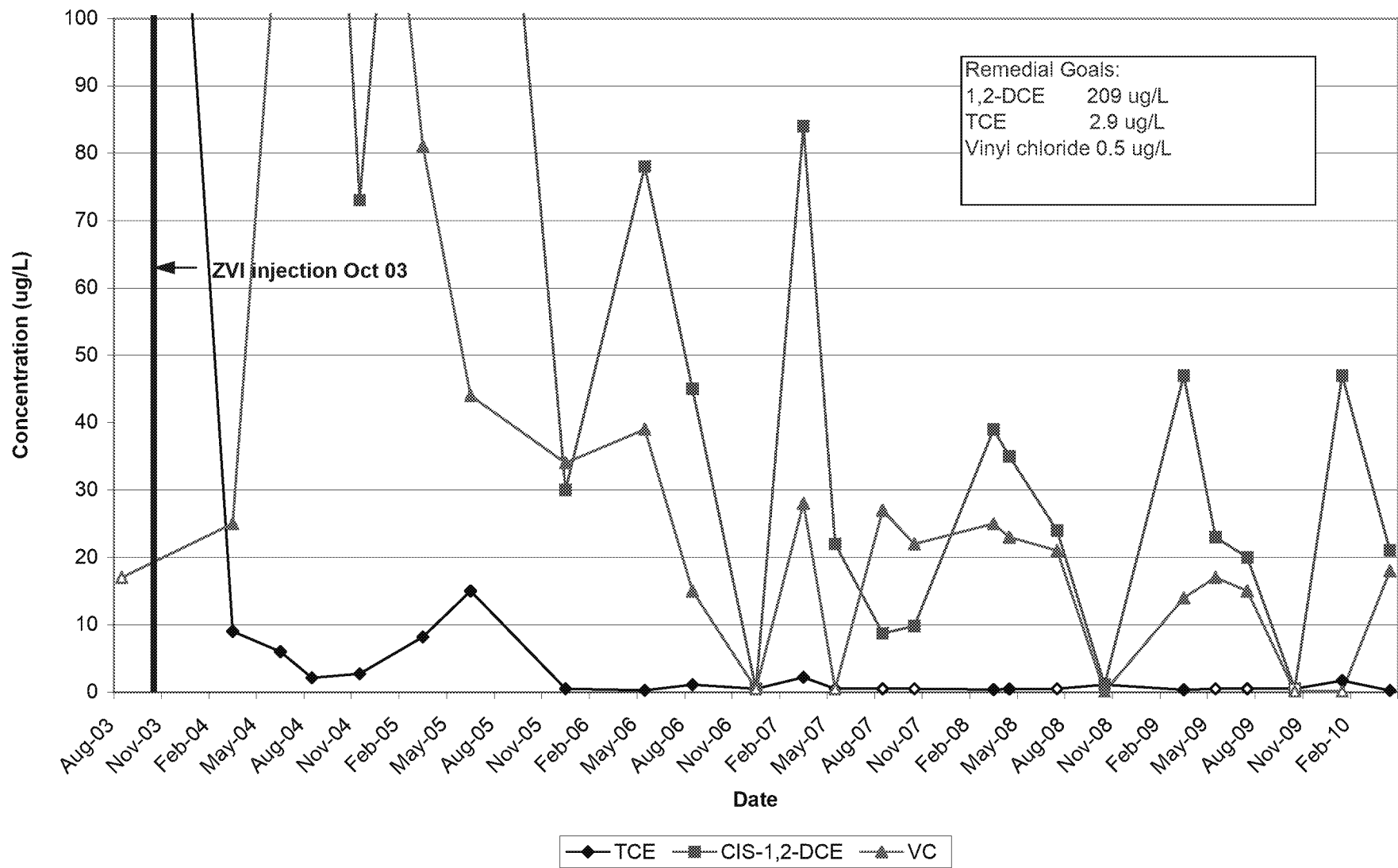
IR10MW59A (detail)



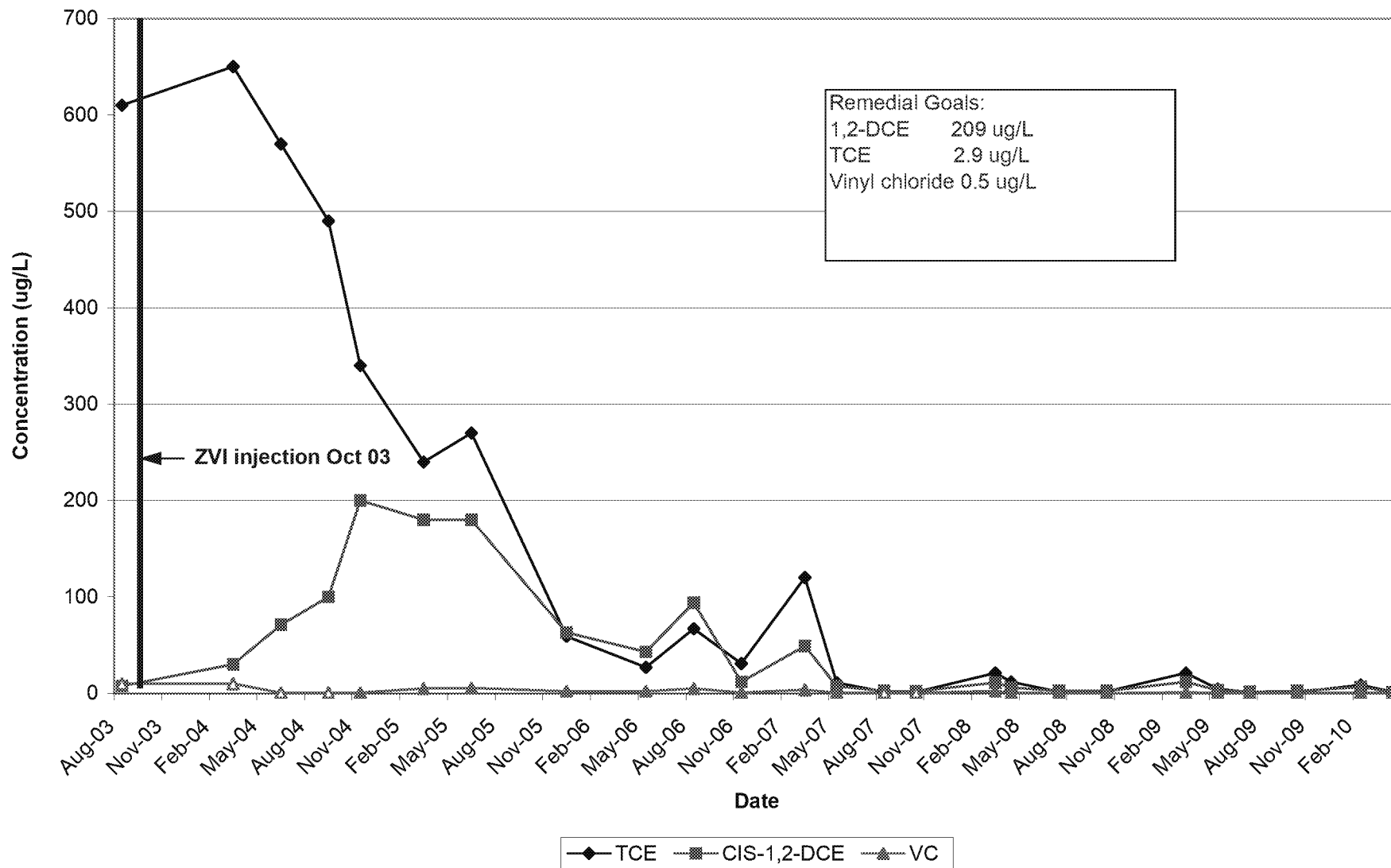
IR10MW61A



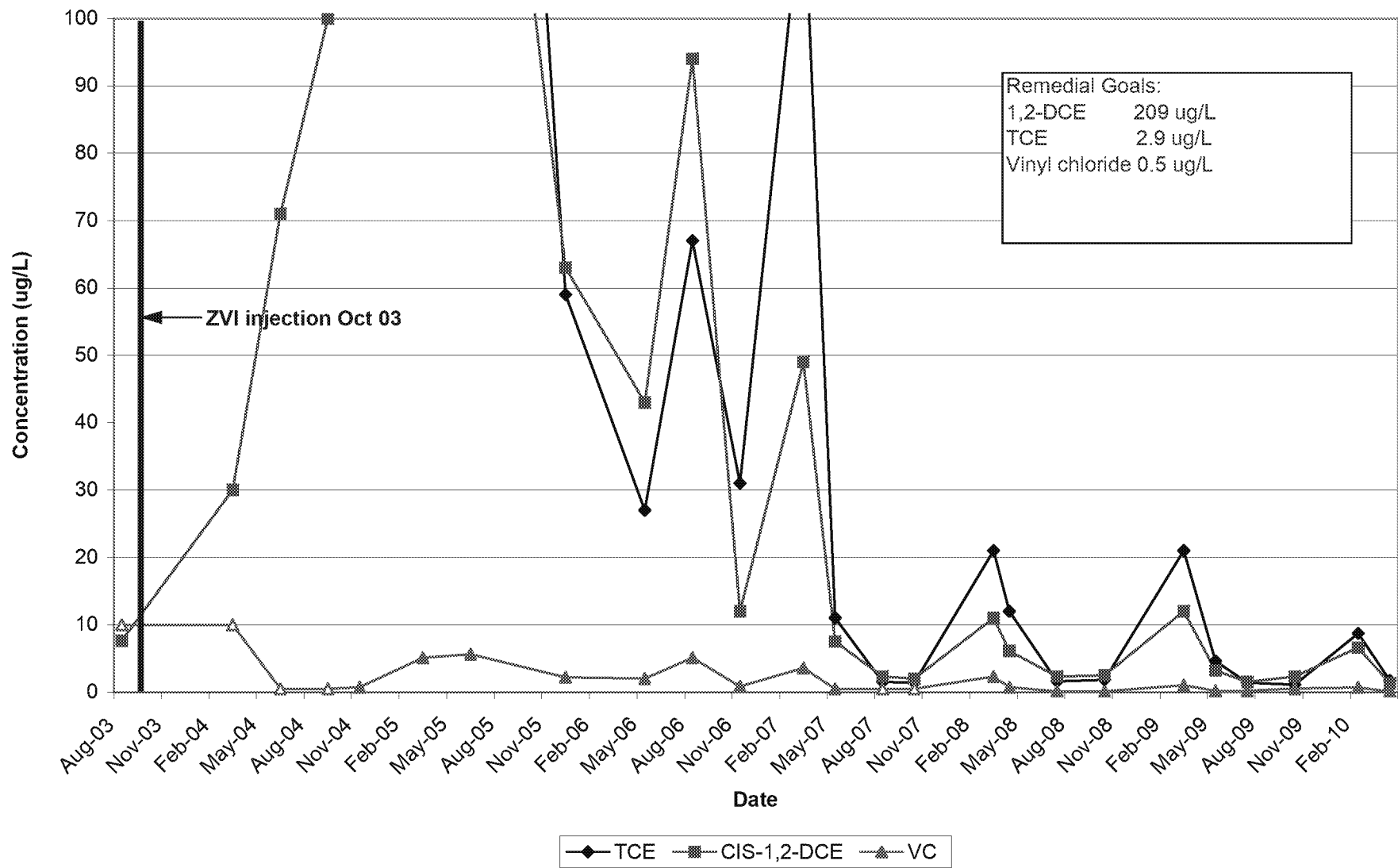
IR10MW61A (detail)



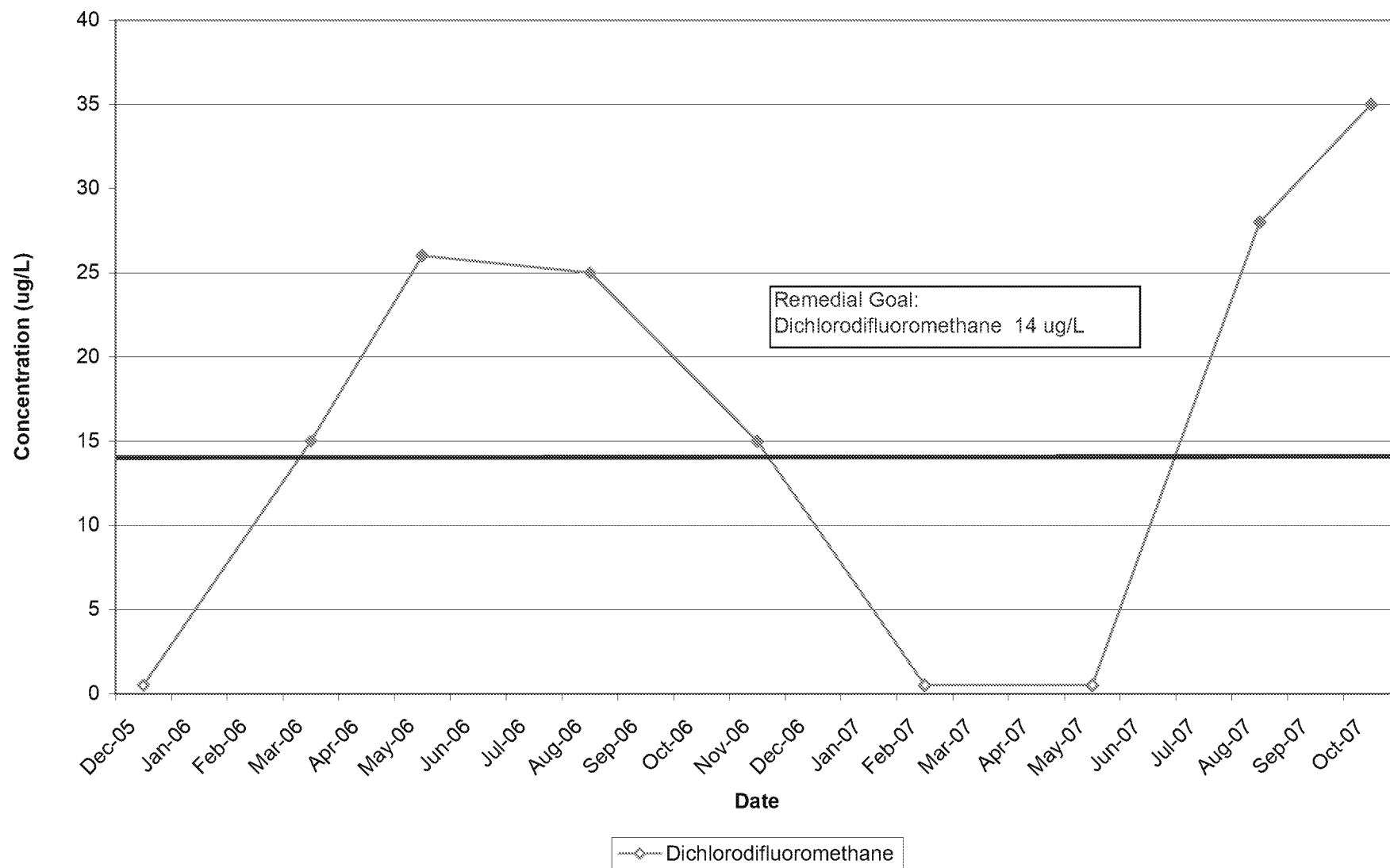
IR10MW71A



IR10MW71A (detail)

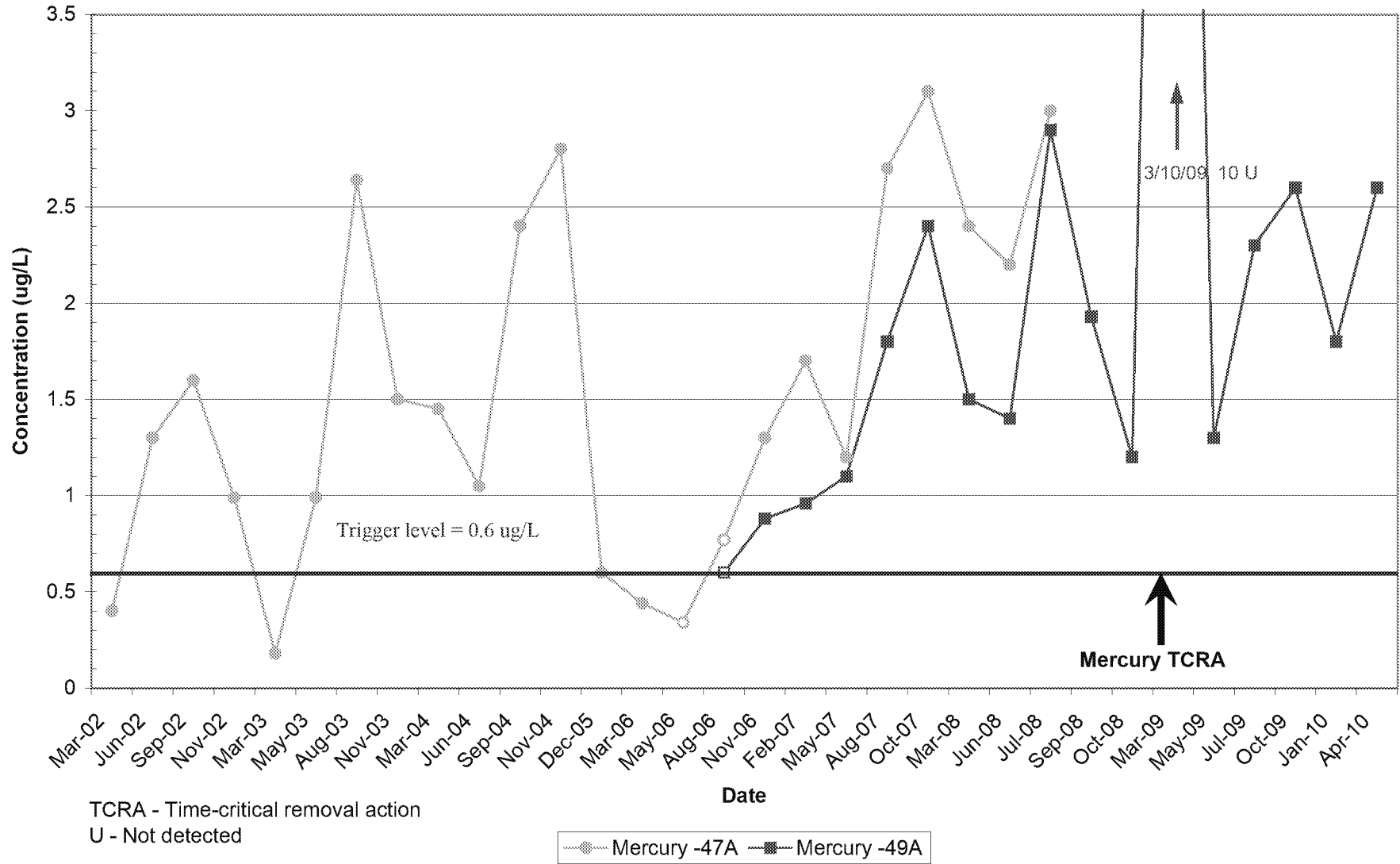


IR26MW41A

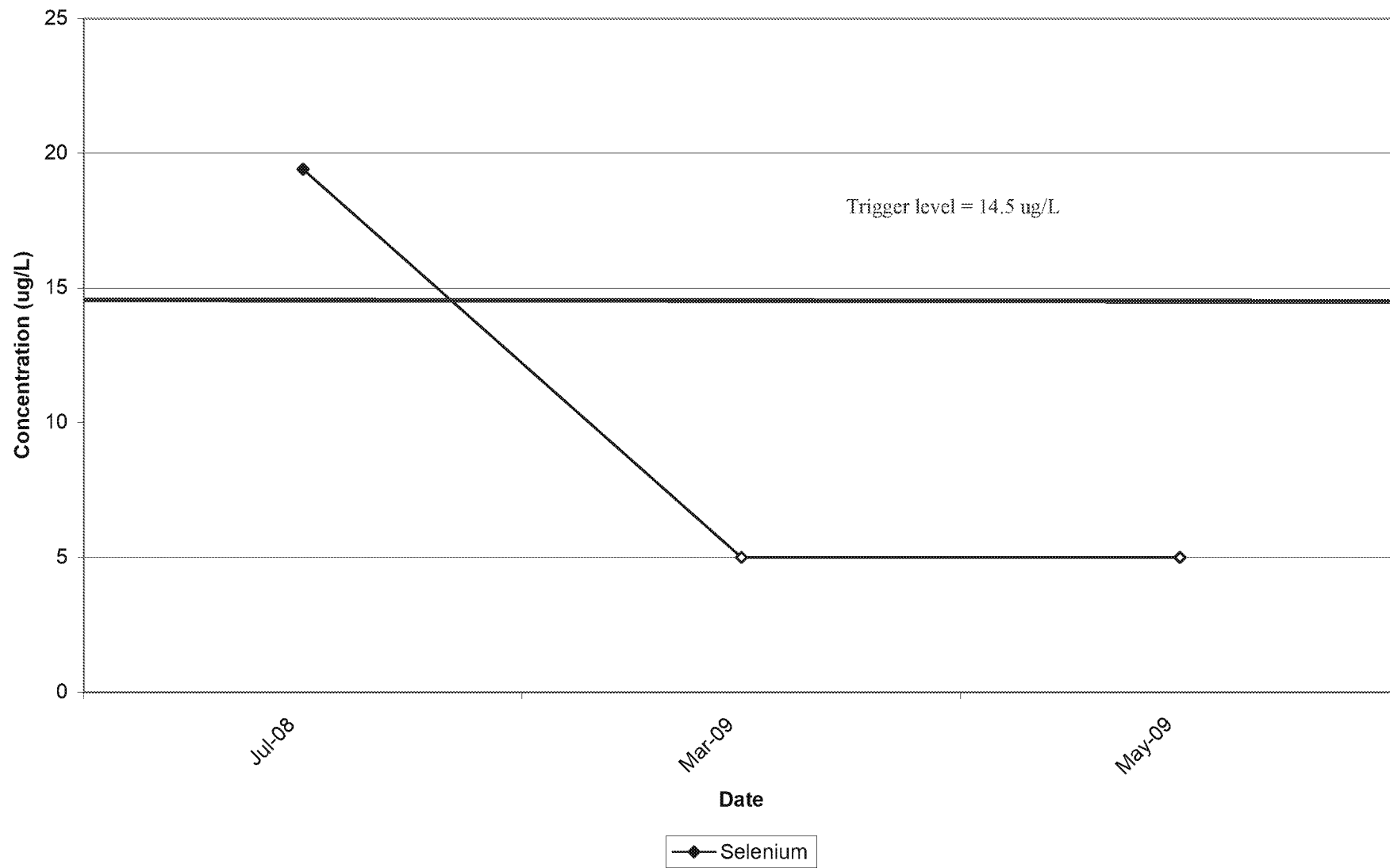


IR26MW47A / IR26MW49A

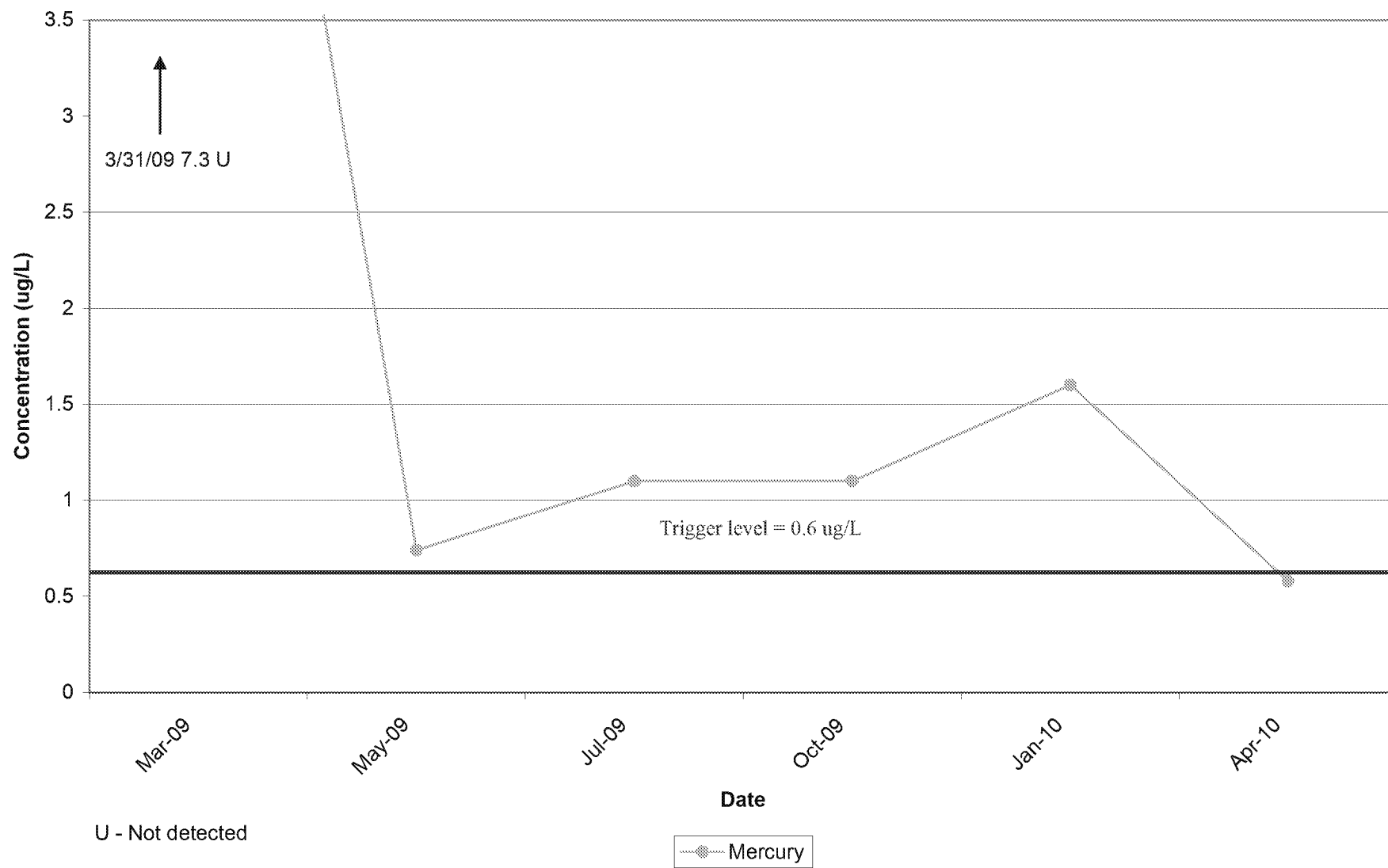
(Well IR26MW47A was decommissioned on 9/23/08; well IR26MW49A used as a replacement.)



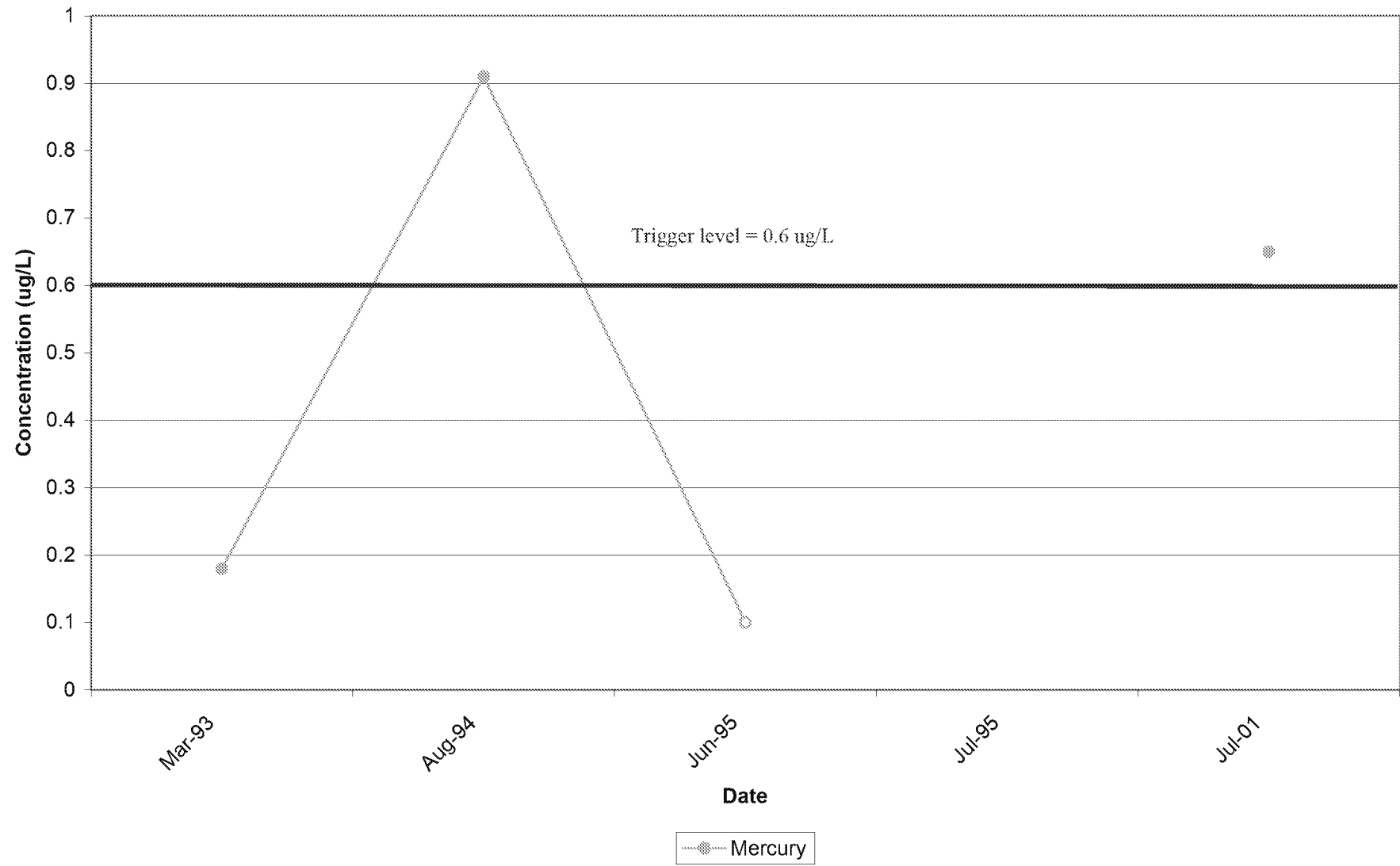
IR26MW49A



IR26MW51A



PA50MW02A



APPENDIX B
MONITORING WELL INFORMATION

TABLE B-1: GROUNDWATER MONITORING WELL CONSTRUCTION INFORMATION, PARCEL B
Remedial Action Monitoring Plan, Parcel B (Excluding IR Sites 7 and 18), Hunters Point Shipyard, San Francisco, California

Well_ID	Parcel	IR_site	Aquifer	Northing	Easting	Ground Surface Elevation (ft msl)	TOC Elevation (ft msl)	Casing Stickup (ft)	Top of Screen (ft bgs)	Base of Screen (ft bgs)	Total Depth (ft bgs)	Top of Screen (ft below TOC)	Base of Screen (ft below TOC)	Casing Diameter (inches)	Casing Type	Installation Date	Decommission Date	Measure Depth to Water ?	Sampling Required ?
IR06MW46A	B	IR-42	A	453055.28	1460945.44	10.03	9.46	-0.57	7.0	17.0	17.0	6.4	17.0	4	PVC	17-Sep-92		Y	N
IR07MW19A	B	IR-23	A	453874.18	1460508.90	10.03	9.56	-0.47	6.0	16.0	16.0	5.5	15.9	4	PVC	06-Dec-90	18-Jun-10	N	N
IR07MWS-1	B	IR-23	A	453601.04	1460162.37	10.63	10.25	-0.38	5.0	18.0	18.0	4.6	18.0	2	SS	02-Sep-86	unknown	N	N
IR10MW12A	B	IR-10	A	453434.25	1460715.61	9.70	9.08	-0.62	3.0	18.0	18.0	2.4	17.9	4	PVC	30-Dec-88	24-Jul-06	N	N
IR10MW13A1	B	IR-24	A	453493.91	1460949.27	10.25	9.92	-0.33	5.0	20.0	20.5	4.7	19.9	4	PVC	22-Dec-88		Y	Y
IR10MW13A2	B	IR-24	A	453491.41	1460947.03	10.22	9.96	-0.26	25.0	40.0	40.0	24.7	40.0	4	PVC	20-Dec-88	18-Jun-10	N	N
IR10MW14A	B	IR-24	A	453314.10	1461123.44	10.60	10.23	-0.37	5.0	20.0	20.0	4.6	20.0	4	PVC	04-Jan-89	18-Jun-10	N	N
IR10MW15A	B	IR-42	A	453130.06	1460834.67	10.09	9.70	-0.39	5.0	18.0	18.0	4.6	18.0	4	PVC	29-Dec-88	15-Oct-98	N	N
IR10MW28A	B	IR-10	A	453331.55	1460886.65	14.14	13.57	-0.57	7.0	17.0	17.0	6.4	16.9	4	PVC	19-Sep-91		Y	N
IR10MW29A1	B	IR-24	A	453398.31	1461092.66	9.78	9.15	-0.63	5.0	15.0	15.0	4.4	14.9	4	PVC	19-Sep-91	18-Jun-10	N	N
IR10MW29A2	B	IR-24	A	453405.99	1461098.08	9.69	9.04	-0.65	48.6	58.6	58.6	48.0	58.6	4	PVC	18-Sep-91	18-Jun-10	N	N
IR10MW31A1	B	IR-24	A	453615.90	1461025.80	10.55	10.34	-0.21	7.0	17.0	17.0	6.8	17.0	4	PVC	03-May-99		N	Y
IR10MW31A1D	B	IR-24	A	453603.38	1461023.58	10.57	9.86	-0.71	5.0	20.0	20.5	4.3	20.0	4	PVC	13-Dec-93	12-Oct-98	N	N
IR10MW31A2	B	IR-24	A	453603.69	1461019.98	10.54	9.96	-0.58	25.0	40.0	40.5	24.4	40.0	4	PVC	31-Jan-94	12-Oct-98	N	N
IR10MW32A	B	IR-10	A	453576.62	1460834.19	10.06	9.77	-0.29	6.0	21.0	21.0	5.7	21.0	4	PVC	17-Mar-94		Y	N
IR10MW33A	B	IR-10	A	453449.25	1460845.00	10.43	10.17	-0.27	5.5	15.5	15.5	5.2	15.3	4	PVC	28-Jun-99	planned for 2010	N	N
IR10MW59A	B	IR-10	A	453416.10	1460841.80	14.20	13.79	-0.41	8.5	17.5	17.5	8.1	17.5	4	PVC	16-Mar-01		Y	Y
IR10MW60A	B	IR-10	A	453439.65	1460856.29	10.40	10.24	-0.15	11.0	21.0	21.0	10.9	21.2	4	PVC	01-Jan-03	18-Jun-10	N	N
IR10MW61A	B	IR-10	A	453432.71	1460925.53	10.35	10.05	-0.30	11.0	21.0	21.0	10.7	21.3	4	PVC	01-Jan-03		N	Y
IR10MW62A	B	IR-10	A	453481.77	1460884.45	9.94	9.53	-0.41	11.0	21.0	21.0	10.6	21.4	4	PVC	01-Jan-03	planned for 2010	N	N
IR10MW63A	B	IR-10	A	453439.22	1460893.67	10.04	9.62	-0.41	11.0	21.0	21.0	10.6	20.4	4	PVC	01-Jan-03	planned for 2010	N	N
IR10MW64A	B	IR-10	A	453490.72	1460851.31	9.79	9.55	-0.25	11.0	21.0	21.0	10.8	21.2	4	PVC	01-Jan-03	18-Jun-10	N	N
IR10MW65A	B	IR-10	A	453297.66	1460885.46	14.16	13.62	-0.54	15.0	25.0	25.0	14.5	25.6	4	PVC	01-Jan-03	09-Nov-09	N	N
IR10MW66A	B	IR-10	A	453315.54	1460913.65	14.15	13.67	-0.48	15.0	25.0	25.0	14.5	25.5	4	PVC	01-Jan-03	09-Nov-09	N	N
IR10MW67A	B	IR-10	A	453339.71	1460801.68	14.26	14.04	-0.22	14.5	24.5	24.5	14.3	24.8	4	PVC	01-Jan-03	09-Nov-09	N	N
IR10MW68A	B	IR-10	A	453352.89	1460832.80	14.21	13.84	-0.37	14.5	24.5	24.5	14.1	24.9	4	PVC	01-Jan-03	09-Nov-09	N	N
IR10MW69A	B	IR-10	A	453353.67	1460860.64	14.23	13.91	-0.32	15.0	25.0	25.0	14.7	25.3	4	PVC	01-Jan-03	22-Jun-10	N	N
IR10MW70A	B	IR-10	A	453361.76	1460918.65	14.37	14.15	-0.22	14.0	24.0	24.0	13.8	24.2	4	PVC	01-Jan-03	16-Jun-10	N	N
IR10MW71A	B	IR-10	A	453394.48	1460873.32	14.16	13.87	-0.29	14.0	24.0	24.0	13.7	24.3	4	PVC	01-Jan-03		N	Y
IR10MW72A	B	IR-10	A	453382.13	1460792.21	14.25	14.12	-0.13	14.3	24.3	24.3	14.1	24.4	4	PVC	01-Jan-03	15-Oct-09	N	N
IR10MW73A	B	IR-10	A	453389.76	1460818.27	14.18	13.46	-0.72	15.0	25.0	25.0	14.3	25.7	4	PVC	01-Jan-03	22-Jun-10	N	N
IR10MW74A	B	IR-10	A	453421.26	1460840.36	14.08	13.77	-0.31	31.6	36.6	36.6	31.3	36.9	4	PVC	01-Jan-03	16-Jun-10	N	N
IR10MW76A	B	IR-10	A	453416.10	1460787.15	14.12	13.83	-0.29	8.0	18.0	18.0	7.7	18.3	4	PVC	01-Jan-03	planned for 2010	N	N
IR10MW77A	B	IR-10	A	453392.07	1460732.31	14.33	13.68	-0.65	15.0	25.0	25.0	14.4	25.6	4	PVC	01-Jan-03	16-Jun-10	N	N
IR10MW78A	B	IR-10	A	453456.31	1460790.23	14.04	13.76	-0.29	14.5	24.8	24.8	14.2	25.0	4	PVC	01-Jan-03	16-Jun-10	N	N
IR10MW79A	B	IR-10	A	453409.00	1460998.00	10.54	10.11	-0.43	11.0	21.0	21.0	10.6	21.3	4	PVC	01-Jan-03		Y	N
IR10MW80A	B	IR-10	A	453468.00	1461004.00	9.93	9.67	-0.26	11.0	21.0	21.0	10.7	21.2	4	PVC	01-Jan-03		N	N
IR10MW81A	B	IR-10	A	453549.88	1460809.44	10.11	9.88	-0.23	7.5	17.5	18.0	7.3	17.5	4	PVC	10-Apr-07		N	Y
IR10MW82A	B	IR-10	A	453442.39	1460721.55	9.99	9.59	-0.40	3.0	18.0	18.5	2.6	18.0	4	PVC	10-Apr-07		Y	N
IR10P13A	B	IR-24	A	453504.27	1460967.72	10.47	9.83	-0.64	5.0	20.0	20.0	4.4	20.0	2	PVC	28-Jan-92	18-Jun-10	N	N
IR10P13AA	B	IR-24	A	453499.00	1460934.00	10.12	9.99	-0.13	5.0	20.0	20.5	4.9	20.0	2	PVC	08-Aug-95	18-Jun-10	N	N
IR10P15A	B	IR-42	A	453143.54	1460819.99	9.76	9.06	-0.70	5.0	15.0	15.0	4.3	15.0	2	PVC	27-Jan-92	14-Oct-98	N	N
IR20MW01A	B	IR-20	A	453143.50	1461520.97	9.42	8.31	-1.11	4.0	18.0	18.0	2.9	18.0	4	PVC	14-May-93	04-Jan-98	N	N
IR20MW06A	B	IR-20	A	453248.66	1461586.86	10.40	9.85	-0.55	8.0	23.0	23.0	7.5	23.0	4	PVC	28-Apr-93	14-Oct-98	N	N
IR20MW11A	B	IR-20	A	453110.78	1461626.99	10.96	10.52	-0.44	6.0	19.0	19.0	5.6	19.0	4	PVC	11-May-93	14-Oct-98	N	N
IR20MW17A	B	IR-20	A	453190.62	1461540.19	10.90	10.51	-0.39	7.0	22.0	22.0	6.6	22.1	4	PVC	27-Apr-94		Y	Y
IR23MW14A	B	IR-23	A	454033.00	1460500.00	9.99	9.61	-0.38	6.0	21.0	21.5	5.6	21.2	4	PVC	01-Aug-95	23-Jul-98	N	N

TABLE B-1: GROUNDWATER MONITORING WELL CONSTRUCTION INFORMATION, PARCEL B
Remedial Action Monitoring Plan, Parcel B (Excluding IR Sites 7 and 18), Hunters Point Shipyard, San Francisco, California

Well_ID	Parcel	IR_site	Aquifer	Northing	Easting	Ground Surface Elevation (ft msl)	TOC Elevation (ft msl)	Casing Stickup (ft)	Top of Screen (ft bgs)	Base of Screen (ft bgs)	Total Depth (ft bgs)	Top of Screen (ft below TOC)	Base of Screen (ft below TOC)	Casing Diameter (inches)	Casing Type	Installation Date	Decommission Date	Measure Depth to Water ?	Sampling Required ?
IR24MW04A	B	IR-24	A	453382.88	1461476.66	9.20	11.16	1.96	6.0	16.0	16.0	8.0	16.0	4	PVC	10-Apr-95	14-Oct-98	N	N
IR24MW05A	B	IR-24	A	453431.87	1461569.70	10.50	10.42	-0.08	7.0	22.0	22.0	6.9	22.0	4	PVC	08-Jan-02		Y	N
IR24MW06A	B	IR-24	A	453410.09	1461597.20	10.60	10.25	-0.35	5.0	20.0	20.0	4.7	20.0	4	PVC	09-Jan-02	31-Jul-04	N	N
IR24MW07A	B	IR-24	A	453461.13	1461531.50	10.10	9.92	-0.18	5.0	20.0	20.0	4.8	20.0	4	PVC	08-Jan-02		N	Y
IR25MW61A1	B	IR-25	A	453212.53	1461365.58	9.74	9.56	-0.18	18.0	28.0	28.0	17.8	28.0	4	PVC	05-Mar-04		Y	N
IR25MW61A2	B	IR-25	A	453206.41	1461374.36	9.83	9.67	-0.16	28.0	33.0	33.0	27.8	33.0	4	PVC	05-Mar-04	planned for 2010	N	N
IR26MW36A	B	IR-26	A	453101.42	1461881.54	7.57	8.28	0.71	5.5	17.5	17.5	6.2	17.5	4	PVC	29-Sep-94	unknown	N	N
IR26MW40A	B	IR-26	A	453255.18	1461821.88	10.48	9.89	-0.59	6.0	26.0	26.5	5.4	26.0	4	PVC	16-Nov-94		Y	N
IR26MW41A	B	IR-26	A	453170.16	1461730.13	10.55	10.15	-0.40	6.0	21.0	21.5	5.6	21.0	4	PVC	11-Nov-94		Y	Y
IR26MW42A	B	IR-26	A	453201.00	1461923.00	8.88	8.18	-0.70	6.0	21.0	21.5	5.3	21.1	4	PVC	13-Oct-95	28-Feb-01	N	N
IR26MW43A	B	IR-26	A	453117.00	1461949.00	7.99	7.09	-0.90	6.0	16.0	16.5	5.1	16.2	4	PVC	13-Oct-95		Y	N
IR26MW44A	B	IR-26	A	452993.00	1461781.00	8.77	8.25	-0.52	6.0	13.0	14.0	5.5	12.9	4	PVC	13-Oct-95		Y	N
IR26MW45A	B	IR-26	A	453031.99	1462451.80	8.47	8.28	-0.19	6.5	16.5	16.5	6.3	16.5	4	PVC	12-May-99	28-Feb-01	N	N
IR26MW46A	B	IR-26	A	453140.89	1462431.10	8.53	8.08	-0.45	7.0	17.0	18.0	6.6	17.0	4	PVC	16-Jan-02		Y	N
IR26MW47A	B	IR-26	A	453141.70	1462633.00	8.14	7.75	-0.39	5.0	15.0	15.0	4.6	15.0	4	PVC	17-Jan-02	23-Sep-08	N	N
IR26MW48A	B	IR-26	A	453015.53	1462497.00	8.34	8.13	-0.21	9.0	19.0	20.0	8.8	19.0	4	PVC	17-Jan-02		Y	N
IR26MW49A	B	IR-26	A	453160.04	1462658.08	8.24	7.99	-0.25	4.5	14.5	15.0	4.3	14.5	4	PVC	25-Jul-06		Y	Y
IR26MW50A	B	IR-26	A	453249.55	1462491.61	7.95	7.42	-0.53	4.5	14.5	15.0	4.0	14.5	4	PVC	26-Jul-06		N	N
IR26MW51A	B	IR-26	A	453185.28	1462587.53	10.93	10.61	-0.32	5.5	15.5	16.0	5.2	15.2	4	PVC	15-Jan-09		N	Y
IR46MW37A	B	IR-24	A	453313.79	1461359.15	10.50	9.58	-0.92	6.0	21.0	21.0	5.1	20.9	4	PVC	17-Mar-94	09-Nov-09	N	N
IR46MW38A	B	IR-24	A	453446.11	1461236.22	10.27	9.78	-0.49	6.0	21.0	21.0	5.5	20.9	4	PVC	16-Mar-94		Y	N
IR46MW39A	B	IR-24	A	453696.82	1461196.22	10.04	9.75	-0.30	6.0	21.0	21.0	5.7	20.9	4	PVC	18-Mar-94	31-Jul-04	N	N
IR46MW39A2	B	IR-24	A	453708.76	1461196.60	10.00	9.32	-0.68	26.0	31.0	31.5	25.3	31.0	4	PVC	11-Jul-94	31-Jul-04	N	N
IR46MW39A3	B	IR-24	A	453700.83	1461207.19	10.11	9.47	-0.64	36.0	41.0	41.5	35.4	41.0	4	PVC	12-Jul-94	31-Jul-04	N	N
IR46MW40A	B	IR-24	A	453506.56	1461448.48	9.85	9.29	-0.56	5.5	21.0	21.0	4.9	20.7	4	PVC	28-Mar-94	14-Oct-98	N	N
IR46MW40A2	B	IR-24	A	453513.31	1461445.00	9.99	9.33	-0.66	26.0	31.0	31.5	25.3	31.0	4	PVC	13-Jul-94	14-Oct-98	N	N
IR46MW40A3	B	IR-24	A	453505.55	1461455.47	9.97	9.28	-0.69	36.0	41.0	41.0	35.3	41.0	4	PVC	14-Jul-94	31-Jul-04	N	N
IR46MW41A	B	IR-46	A	453315.08	1461733.30	10.12	9.57	-0.55	6.0	21.0	21.5	5.5	20.9	4	PVC	19-May-94		Y	N
IR46MW42A	B	IR-24	A	453841.59	1461050.49	10.21	9.53	-0.68	6.0	21.0	21.5	5.3	21.0	4	PVC	19-May-94	13-Oct-98	N	N
IR46MW43A	B	IR-24	A	453865.93	1460868.23	9.48	8.98	-0.50	6.0	21.0	21.0	5.5	20.7	4	PVC	18-May-94		Y	Y
IR46MW46A	B	IR-24	A	453729.00	1461225.00	10.35	9.61	-0.74	6.0	21.0	21.5	5.3	21.2	4	PVC	12-Oct-95		Y	N
IR46MW47A	B	IR-24	A	453641.00	1461337.00	10.22	9.69	-0.53	6.0	21.0	21.5	5.5	21.1	4	PVC	12-Oct-95		Y	N
IR46MW48A	B	IR-24	A	453542.00	1461472.00	9.48	8.89	-0.59	6.0	21.0	21.5	5.4	21.1	4	PVC	12-Oct-95		Y	N
IR46MW49A	B	IR-46	A	453390.31	1461585.67	11.27	10.97	-0.31	10.0	20.0	20.0	9.7	20.0	4	PVC	17-Sep-08		N	N
IR46MW50A	B	IR-46	A	453684.63	1461277.82	10.04	9.58	-0.46	5.5	20.5	20.5	5.0	20.5	4	PVC	30-Oct-08	09-Nov-09	N	N
IR46MW51A	B	IR-46	A	453452.84	1461555.19	10.14	9.88	-0.26	5.0	20.0	20.0	4.7	20.0	4	PVC	30-Oct-08	09-Nov-09	N	N
IR46MW52A	B	IR-46	A	453427.02	1461535.28	10.61	10.34	-0.27	5.0	20.0	20.0	4.7	20.0	4	PVC	30-Oct-08	09-Nov-09	N	N
IR46P38AA	B	IR-24	A	453435.01	1461253.16	10.04	10.68	0.64	6.0	31.0	31.5	6.6	31.0	2	PVC	19-Sep-94	09-Nov-09	N	N
IR46P38AB	B	IR-24	A	453445.96	1461259.27	10.60	10.75	0.15	6.0	21.0	21.5	6.2	21.0	2	PVC	20-Sep-94	09-Nov-09	N	N
IR60MW04A	B	IR-60	A	453962.00	1460602.00	9.78	9.34	-0.44	6.0	21.0	22.0	5.6	21.1	4	PVC	31-Jul-95	23-Jul-98	N	N
IR60MW08A	B	IR-60	A	453842.00	1460745.00	9.74	9.40	-0.34	6.0	21.0	21.5	5.7	21.2	4	PVC	31-Jul-95	25-Jul-06	N	N
IR60MW10A	B	IR-60	A	453836.00	1460639.00	9.87	9.11	-0.76	6.0	21.0	21.5	5.2	21.1	4	PVC	09-Aug-95	27-Aug-98	N	N
IR61MW04A	B	IR-61	A	453442.00	1460567.00	10.65	10.35	-0.30	6.0	21.0	21.5	5.7	21.1	4	PVC	27-Jul-95	18-Jun-10	N	N
IR61MW05A	B	IR-61	A	453484.00	1460621.00	10.51	10.11	-0.39	6.0	21.0	21.5	5.6	20.8	4	PVC	28-Jul-95		Y	N
IR62MW07A	B	IR-23	A	453364.00	1460435.00	10.46	10.20	-0.26	6.5	21.5	21.5	6.2	21.5	4	PVC	22-Aug-95		Y	N
IR62MW08A	B	IR-62	A	453176.00	1460458.00	10.89	10.35	-0.55	6.0	16.0	17.0	5.5	16.0	4	PVC	23-Aug-95		Y	N

TABLE B-1: GROUNDWATER MONITORING WELL CONSTRUCTION INFORMATION, PARCEL B
Remedial Action Monitoring Plan, Parcel B (Excluding IR Sites 7 and 18), Hunters Point Shipyard, San Francisco, California

Well_ID	Parcel	IR_site	Aquifer	Northing	Easting	Ground Surface Elevation (ft msl)	TOC Elevation (ft msl)	Casing Stickup (ft)	Top of Screen (ft bgs)	Base of Screen (ft bgs)	Total Depth (ft bgs)	Top of Screen (ft below TOC)	Base of Screen (ft below TOC)	Casing Diameter (inches)	Casing Type	Installation Date	Decommission Date	Measure Depth to Water ?	Sampling Required ?
PA24MW01A	B	IR-24	A	453756.60	1460910.10	9.42	10.12	0.70	6.0	26.0	26.0	6.7	26.0	4	PVC	25-Jan-93	15-Dec-09	N	N
PA24MW02A	B	IR-24	A	453612.49	1461318.15	10.06	9.46	-0.60	6.0	21.5	21.5	5.4	22.1	4	PVC	22-Jan-93	31-Jul-04	N	N
PA24MW03A	B	IR-24	A	453434.65	1461548.13	10.65	10.09	-0.56	5.0	15.0	15.0	4.4	15.0	2	PVC	27-Jun-00	22-Mar-01	N	N
PA24MW03AD	B	IR-24	A	453439.27	1461553.01	10.56	9.97	-0.59	6.0	26.0	26.0	5.4	26.0	4	PVC	25-Jan-93	13-Oct-98	N	N
PA50MW01A	B	IR-24	A	453658.20	1460792.22	9.73	9.18	-0.55	6.0	16.2	16.2	5.5	16.3	4	PVC	08-Mar-93	10-Apr-07	N	N
PA50MW02A	B	IR-28	A	452949.76	1461934.39	8.41	7.80	-0.61	6.0	16.0	16.0	5.4	16.0	4	PVC	08-Mar-93		Y	Y
UT02MW15A	B	Not Assigned	A	453338.16	1460317.32	11.18	12.57	1.39	4.5	19.5	19.5	5.9	19.5	4	PVC	10-May-94		Y	N
UT02MW16A	B	Not Assigned	A	453352.53	1460260.00	10.66	9.91	-0.75	4.5	19.5	20.0	3.8	19.5	4	PVC	18-May-94	04-Jan-98	N	N
UT02MW17A	B	Not Assigned	A	453448.18	1460276.85	9.44	10.12	0.68	5.0	15.0	15.5	5.7	15.0	4	PVC	18-May-94	09-Nov-09	N	N
UT03MW10A	B	Not Assigned	A	453569.46	1460259.39	11.02	10.60	-0.42	5.0	14.5	15.0	4.6	14.5	4	PVC	09-May-94	unknown	N	N
UT03MW11A	B	Not Assigned	A	453634.94	1460185.06	10.56	9.94	-0.61	5.0	20.0	20.5	4.4	20.0	4	PVC	19-May-94	planned for 2010	N	N
UT03MW12A	B	Not Assigned	A	453575.93	1460331.93	10.72	10.10	-0.62	6.0	21.0	21.5	5.4	21.0	4	PVC	23-May-94	02-Jul-07	N	N
UT03MW16A	B	Not Assigned	A	453657.00	1460392.00	11.14	10.45	-0.69	6.0	21.0	21.5	5.3	21.1	4	PVC	16-Oct-95		Y	N

Notes: Blank cells indicate no data available or not applicable.

- bgs
- ft
- IR
- msl
- PVC
- TOC
- Below ground surface
- Feet
- Installation Restoration
- Mean sea level
- Polyvinyl chloride
- Top of casing